BEACH EROSION CONTROL PROJECT
REVERE BEACH
REVERE, MASSACHUSETTS

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Robert Meader

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US Army Corps of Engineers
New England Division
424 Trapelo Road
Waltham, Massachusetts 02254-9149

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This manual is intended to serve as the basis for defining the responsibilities of the Metropolitan District Commission and the New England Division of the US Army Corps of Engineers in maintaining and operating the beach erosion project at Revere Beach, Revere, Massachusetts in accordance with regulations prescribed by the Department of the Army, Office of the Chief of Engineers.

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OPERATION AND MAINTENANCE MANUAL
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FOREWARD

In order to assure a beach erosion control project successfully performs the function it was designed for, it must be carefully monitored and maintained to operate properly at all stages of the tide as well as during periodic storm events. The need for proper maintenance cannot be over emphasized for public safety. Failure to do so may result in substantial unnecessary damages to life and property, including loss of the seawall and the roadway.

Proper maintenance and operation requires that the parties responsible for carrying them out have a thorough understanding of how the project functions and are provided with instructions describing recommended methods to be employed under all anticipated operating conditions.

This manual is intended to serve as the basis for defining the responsibilities of the Metropolitan District Commission (the local sponsor) and the New England Division of the U.S. Army Corps of Engineers in maintaining and operating the beach erosion control project at Revere Beach, Revere, Massachusetts in accordance with regulations prescribed by the Department of the Army, Office of the Chief of Engineers.

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SECTION I

INTRODUCTION

1. PURPOSE OF THIS MANUAL

This manual is intended to provide detailed information to be used as a guide by the Metropolitan District Commission (the local sponsor) in complying with the requirements of the Local Cooperation Agreement (LCA) for the Revere Beach Erosion Control Project and Engineering Regulation (ER) 1110-2-2902 entitled "Prescribed Procedures for the Maintenance and Operation of Beach Erosion Control Works" prepared by the Department of the Army, Office of the Chief of Engineers (see Appendix A). The details set forth in this manual are intended to supplement the ER to insure that all the protection benefits the project was designed to provide are realized.

2. AUTHORIZATION

Construction of the beach erosion control project at Revere Beach, Revere, Massachusetts was authorized by House Public Works Committee Resolution dated 15 December 1970 and Senate Public Works Committee Resolution dated 17 December 1970. The pre-authorization report was published as House Document No. 91-211, 91st Congress, 2nd Session.

3. LOCATION

Revere Beach is located in the city of Revere, Massachusetts, on the Atlantic Ocean coastline five miles north of the city of Boston. The crescent shaped beach is situated on Broad Sound and extends approximately 14,000 feet from Eliot Circle northward to Carey Circle.

4. HISTORY OF DAMAGE

Revere Beach has suffered from long-term erosion, primarily due to extensive development of the shoreline and the existence of protective coastal structures which have limited the landward advance of the shoreline at the expense of the beach. Since shoreline construction by the Metropolitan District Commission (MDC) began over 90 years ago, man's influence on the coastal processes at Revere Beach has steadily increased. By 1940 flooding of the backshore necessitated replacement of the concrete curb bordering the promenade with a concrete retaining wall. In 1949 the Corps of Engineers recommended the beach berm elevation be raised to 18 feet above Mean Low Water (MLW) to protect backshore structures which were being damaged by wave

action. The MDC in 1954 placed approximately 172,000 cubic yards of sandfill dredged from offshore but much of the fill was lost due to erosion and a hurricane. In 1968 Revere Beach was suffering from erosion which allowed storm waves to break against the backshore protective structures. The most significant storm damage occurred during the "Blizzard of 1978" when a Nor'easter battered the coast through two tidal cycles. The seawall was severely damaged and several park structures lost roofs due to wind and breaking waves.

5. DESCRIPTION OF THE PROTECTION PROJECT

The beach erosion control project consists of beach widening by the direct placement of suitable sandfill along approximately 14,000 feet of shorefront, thereby providing a 50-foot wide level beach berm at elevation 18.0 feet above MLW with about a 185-foot wide dry beach area above the mean high water line.

6. PROTECTION PROVIDED

Although there are some recreational benefits (7%) associated with the project, the benefits of the beach restoration project are primarily (93%) derived from protection of the seawalls in back of the beach. The project will restore the recreational aspects of the beach by providing a usable dry beach width of approximately 185 feet shoreward of the mean high water line.

It must be emphasized that the project's primary goal is reduction of storm damages to the seawalls from relatively minor storms that occur quite frequently. The beach fill is not designed to withstand continuous wave action from major storm events. If a major event occurs, the beach fill is expected to be eroded and the seawalls may become exposed to the damaging effects of wave and tidal action. The design wave conditions used to determine the beach berm height were a stillwater level of 12.9' above MLW and a 9' depth limited wave. The height of runup added to the stillwater level set the elevation of the beach berm. Protection of the seawalls from a more severe storm than a one or two year event would require a higher beach berm elevation.

7. CONSTRUCTION HISTORY

The project was constructed by John J. Paonessa Construction, Inc. during the period of 16 October 1990 to 26 June 1992 at a cost of $4,367,644.53. Construction of the beach was completed on 31 July 1991. Approximately 600,000 c.y. of sand was placed on Revere Beach. The source of the material was the abandoned I-95 embankment in Revere and Saugus marsh where 670,000 c.y. were excavated and screened to remove all material larger than 3/8 inch.

8. ASSURANCES OF LOCAL COOPERATION

The Department of the Army and the MDC entered into a LCA for this beach erosion control project on May 31, 1990 as required by Section 221 of Public Law 91-611. A copy of the duly executed LCA is included as Appendix B.

9. PLANS

Reduced size as-built drawings showing the project immediately after construction are included as Appendix D.

SECTION II

GENERAL REGULATIONS

10. GENERAL RULES AND REGULATIONS

Paragraph 8.a. of ER 1110-2-2902 shown in Appendix A gives general rules and regulations for the maintenance and operation of structures and facilities constructed by the United States for beach erosion control. Applicable portions are cited below to avoid the necessity of cross referencing and are further defined by remarks under each citing.

(1) "The structures and facilities constructed by or with the financial assistance of the United States for local shore protection and required locally furnished appurtenant facilities shall be maintained and operated in such a manner and for such periods as necessary to obtain the anticipated project benefits."

These requirements cannot be overstressed. The MDC must make adequate provisions for funds, personnel, equipment and materials to properly maintain and operate the protective works over its entire 50 year economic project life. Project benefits are derived from having the sand prevent damages to the seawalls. If the beach is allowed to deteriorate due to neglect, the seawalls will become exposed to daily wave action and periodic storm damage. Under these circumstances the project will not provide its intended benefits.

(2) "The agency, which furnished assurances that it will maintain and operate shore protection works in accordance with Federal law, shall appoint a permanent official, hereinafter called the "Superintendent", who shall be directly in charge of the organization responsible for the efficient operation of all of the structures and facilities, and for inspection and maintenance of the project works, all without cost to the United States. The Superintendent may be established from within the existing governmental organization."

The responsible organization should be composed of MDC workers or officials, preferably ones experienced in engineering and construction practices. The organization must be granted broad authority to carry out its responsibilities. The name, business address and office and home telephone numbers of the duly appointed Superintendent, and any changes thereof, shall be promptly furnished to the Division Engineer, New England Division, Corps of Engineers, once the individual has been appointed. A designation of Superintendent form is included in Appendix C.

(3) "The Superintendent will develop a storm emergency plan to cope with storm events greater than the project design storm. The plan should cover measures that minimize the threat to life and damage to property and provide instructions for an orderly storm recovery effort. Depending on circumstances, it may be desirable to acquire and store certain types of goods, materials and equipment for evacuation, flood fighting, emergency food, water and sanitary needs, and security."

A general discussion of what should be contained in the storm emergency plan is presented in Section III under item 17.A. of this manual. The details of the plan are left to the discretion of the local sponsor. It is important to remember that project benefits are derived from damage prevention during relatively minor storms. Significant storms are expected to cause damage to the beach and possibly the seawall and the Superintendent needs to have the means available to make emergency repairs immediately after a storm (such as blocks, dumped stone or sand bags) to protect the seawall. Provisions should be made to have funds, materials, and resources available to make these repairs.

(4) "No other improvements shall be constructed over, under, or through the beach fill or other protective feature, nor shall any excavation or construction be permitted within the limits of the project right-of-way, nor shall any change be made in the project without prior written approval of the (District Commander, sic.) Division Engineer, U.S. Army Corps of Engineers or an authorized representative. Advice regarding the effect of proposed improvements or alterations on the functioning of the project and information concerning methods of construction, acceptable under standard engineering practice, shall be obtained from the (District Commander, sic.) Division Engineer or, if otherwise obtained, shall be submitted for the (District Commander, sic.) Division Engineer's approval. Standard engineering drawings showing such improvements or alterations as finally constructed shall be furnished to the (District Commander, sic.) Division Engineer not more than 90 days after completion of the work."

Any proposed improvements or alterations as outlined above must be submitted to the U.S. Army Engineer Division, New England, Waltham, Massachusetts, and the approval of the Division Engineer obtained prior to the MDC implementing the work. All requests for approval shall be submitted in writing and be accompanied by two (2) complete sets of drawings, one set of which shall be in reproducible form, along with a full description of the intended work. The MDC will be held responsible for obtaining prior approval from the Corps of Engineers for any improvements or alterations proposed by itself, or any other private or public party. The MDC shall furnish the Division Engineer as-built drawings, in duplicate, of the completed work.

(5) "It shall be the duty of the Superintendent to maintain organized records of activities and costs covering maintenance, operation, condition, inspection, repair and replacement of protective works available for the (District Commander, sic.) Division Engineer's or authorized representative's inspection and notation in the Superintendent's office upon written request."

See paragraph 15 of this Section for instructions on preparing reports and maintaining records.

(6) "The (District Commander, sic.) Division Engineer, and authorized representatives, shall have access at all times to all portions of the project."

Arrangements shall be made to insure unrestricted access to the project by the Division Engineer or his representative during any periodic inspection of the protective works to insure that the project is being properly maintained and operated by the MDC.

(7) "The Superintendent shall assure that maintenance measures or repairs which the (District Commander, sic.) Division Engineer deems necessary are promptly taken or made. Failure to act within 30 calendar days after receipt of the (District Commander, sic.) Division Engineer's notice may result in the Government completing the work and pursuing a remedy by law as provided in the local agreement contract."

The MDC is obligated to maintain the facilities and keep them in good repair without having to have the Division Engineer call such matters to its attention. During the annual beach monitoring, the Division office will advise the MDC of any repairs that are needed and how to best accomplish them in an expeditious manner.

11. MAINTENANCE

The word "maintenance" as used in this manual applies to the upkeep, repair and care of the work constructed by the United States and turned over to the MDC. If maintenance is neglected, the project will eventually deteriorate to the extent that the beach berm and foreshore will lose its erosion control (reduction in storm damage) capability during storms and will not be suitable for recreation during the beach bathing season. The majority of the maintenance work will consist of moving sand from areas of the beach that have excess sand available to areas that have experienced some erosion and are in need of sand. The cost of maintaining the beach is to be borne soley by the MDC.

Maintenance should also include a regular walking inspection of the entire project. The purpose of an inspection program is to detect any deterioration that would adversely affect the performance of the works and to point out areas that are in need of repair or replacement. In order to insure the project operates properly it will be necessary to provide constant maintenance. The organization responsible for its maintenance must be familiar with the overall project. Paragraph 17.B provides additional background and further details concerning maintenance.

12. BEACH MONITORING

Beach monitoring, as used in this manual, refers to technical observations and evaluations of the beach using for example: beach profiles, and/or sediment sampling. A monitoring program of the beach is required to determine when future nourishment must be accomplished to maintain the designed level of protection. The monitoring shall be performed annually by the Government and cost-shared by the MDC for a period of 50 years from the date of completion of initial construction.

13. PERIODIC NOURISHMENT

Periodic nourishment, as used in this manual, refers to the practice of periodically placing sandfill on the beach to replenish that which was lost due to erosion. Replacing the sand will in effect restore the beach's ability to provide the level of protection necessary to obtain the maximum "benefits" it was intended to provide.

Periodic nourishment is considered "continued construction" as defined in paragraph 4 of ER 1110-2-2902 and Article I of the LCA. Because it is considered to be a continuation of construction, periodic nourishment is eligible for cost sharing between the local sponsor and the Government. The details of

this cost sharing are described in the LCA. Aside from the cost sharing differences, it is important to note that project maintenance is an ongoing responsibility of the local sponsor, whereas, periodic nourishment will be performed only on an as needed basis.

The conditions necessary to trigger periodic nourishment are described in SECTION III, paragraph 17.c. The Government will be responsible for deciding when the conditions warrant the process to occur.

14. OPERATION

The term "operation" as used in this manual, refers to the actual use of the beach erosion control works during all periods of the tide. It is felt that the procedures outlined herein will be sufficient to insure the project provides all the protection it was intended to.

To insure correct operation, it is essential that at least one person, usually the Superintendent, be familiar with all aspects of the protection works, knows what supplies and equipment are available, and knows what personnel and gear can be mobilized for inspection and repair work when necessary.

15. REPORTS AND REPORTING

The regulations prescribed herein by the Department of the Army call for the Superintendent to maintain organized records of all inspections, surveys, activities and costs associated with maintenance, repair and replacement of the protective works. The number of inspections and surveys to be performed is discussed in SECTION III of this manual.

To assist the Superintendent in keeping organized records, inspection and survey forms have been developed and are contained in Appendix C. The Superintendent will be required to provide to the Division Engineer a brief report along with the inspection or survey form that covers the following points:

(a) A description of the maintenance work performed since the previous inspection including all associated costs.

(b) The number and classification of personnel that maintain the project on a regular basis and those that also work on it intermittently.

(c) Description of any work performed by contract for the repair or improvement of the project.

(d) Any other incidental information pertinent to the overall operation and maintenance of the project.

Every time an inspection or survey is performed, the Superintendent shall submit an inspection or survey form in triplicate to the Division Engineer. The procedure for submitting the forms is described in Article XVIII of the LCA.

SECTION III

BEACH EROSION CONTROL WORK

16. DESCRIPTION OF PROJECT COMPONENTS

The authorized beach erosion control project consists of the placement of suitable sandfill along 14,000 feet of shoreline as described in SECTION I. This will provide for reduction in storm damages caused by direct wave attack on the MDC seawall.

17. FORESHORE EROSION CONTROL

This section covers the details of the operation and maintenance needed for the foreshore erosion control works.

A. OPERATION

Paragraph 8.b.(1) and 8.c.(1) of ER 1110-2-2902 describes the rules for the operation of foreshore erosion control works which is the responsibility of the MDC. The following outlines what is contained in that regulation and elaborates on it.

The major component of the prescribed operation requirements for the beach involves taking survey profiles using MLW datum and conducting periodic inspections. The annual survey will be performed by the Government during the month of September and provided to the MDC. An inspection will be performed annually in April by the MDC Superintendent and again in September or October by both the Superintendent and a Corps representative. Additional inspections will be performed by the MDC Superintendent after any storm that produces a stillwater level of 8.5 feet NGVD or higher on the Boston Harbor NOAA tide gage.

The survey, at a minimum, will consist of eight profiles (at locations shown on Figures 1-8 in Appendix C) running perpendicular to an established baseline and extending seaward for a distance of approximately 450 feet or until elevation 0.0 MLW is encountered. The location of the baseline is shown on the as-built drawings in Appendix D.

The inspections will be performed by the Superintendent in accordance with the inspection form provided in Appendix C. The items that need to be documented by the Superintendent while conducting the inspection are outlined on the form. Photographs will also need to be taken during the course of the inspection to support the information provided on the form. This form along with the photographs (properly labeled) will be submitted to the Division Engineer as specified in paragraph 15 of SECTION II.

Two other operation measures also need to be addressed for the foreshore erosion control works. The first is to provide appropriate beach conditions for the healthy recreation of the populace. If a majority of the items checked on the inspection form are found to be satisfactory, the appropriate conditions for recreation will be satisfied.

Secondly, preparing for an emergency is also considered an integral part of the project operation. The MDC will have to identify what they intend to use as a source of sand and have a plan in place to mobilize required equipment and personnel in case of an emergency. A composite of gradation curves for the sand placed on the beach during the original construction is provided in Appendix D for use by the MDC when identifying a compatable emergency sand source. An emergency condition is considered to exist when any major individual storm or back to back storms severely erode and threaten to breach the beach berm to the extent that the seawall may be exposed to direct wave attack. Sand would be required in breached areas to eliminate the emergency condition and may be obtained from any suitable nearby source or other parts of the beach that have an excess amount in order to protect the seawall.

B. MAINTENANCE

Paragraph 8.d.(1) of the prescribed regulations sets forth rules for maintaining foreshore erosion control works. The following paragraphs highlight these rules and expand on them.

It may be helpful to provide some background as to how the beach provides protection to the seawall. Storm waves are formed by high winds blowing across open water. The large amount of energy transferred from the wind to the wave is released as the wave breaks against the land. One can easily recall pictures of waves breaking against rocks and shooting water high into the air and imagine the tremendous energy it takes to move water in that manner. Before the Revere Beach Erosion Control Project placed sand in front of the seawall along the boulevard, storm waves were able to break directly against the seawall. Now, the waves are forced to break before reaching the seawall because of

the shallow water created by the beach fill. Waves breaking on the beach expend much of their energy before reaching the seawall. The project is performing its job as long as there is enough sand on the beach to force the waves to break on the beach rather than the seawall. Unfortunately, sand placed on the beach will not remain in the same location for very long. Winter storms tend to move sand offshore or along shore while during the summer season the gentler wave climate usually brings some, but not all, of the sand back on the beach. The constant movement of sand must be monitored through periodic profile surveys in order to be able to provide continuous protection to the seawall.

Maintaining sufficient sand on the beach is one of the most important maintenance items to be performed. The beach berm was originally constructed at elevation +18' MLW and extended 50' out from the seawall. Storms have reshaped the berm to slope away from the seawall. As long as there is sand above elevation +18' MLW for at least 25' out from the seawall, waves from a "one year event" will be kept from breaking directly against the seawall. However, if portions of the sand remaining on the beach for at least 25' out from the seawall have elevations less than +18' MLW, then those portions of the berm are not adequate to provide the required protection to the seawall and they need to be reshaped as near to their constructed condition as possible. This may include but is not limited to redistribution of sand from areas of the beach which have excess sand. Sand may be moved away from one area of the beach to another provided a minimum profile with a berm width of 25 feet extending seaward from the seawall at an elevation of +18' MLW from there sloping seaward at 1 vertical on 15 horizontal is maintained at the borrow area. There will be a point at which either no sand or insufficient sand is available on the beach for maintenance, indicating that nourishment will be required. Figures 1-8 show the minimum required beach profiles prior to maintenance.

The following table displays the approximate distance from the top of the seawall to elevation +18' MLW at eight beach profile locations.

Profile Stations	Maximum Vertical Distance Between Top of Seawall and Beach Berm at Elev. +18' MLW (In Feet)
-0+20	2.1
13+95	3.0
41+00	7.3
53+17	3.6
64+00	4.9
100+00	2.9
122+00	2.8
134+50	2.2

The Superintendent will also be responsible for making sure that the following items of maintenance are followed:

* All drainage onto the beach berm is prevented to avoid erosion.

* All storm drains are maintained and the temporary drainage pipe extensions shown on the as-built drawings are replaced when needed.

* Preserve and repair the parking area as needed.

* Guard against sand being blown onto the road, parking area and nearby yards and gutters. If piles of wind blown sand exist, remove them and place the sand back on the beach.

* Keep area free of trash and debris.

C. PERIODIC NOURISHMENT

Periodic nourishment is considered continued construction and not maintenance as previously discussed in SECTION II of this manual. The conditions that would require initiation of the nourishment process will be determined from the information provided by the annual beach monitoring as well as visual inspection. The "trigger" will likely be a determination that sand for normal maintenance work described earlier is no longer available at the beach. Items such as the width of dry beach, elevation of the beach berm, slope of the beach face, estimated volume of sand lost when compared to as-built profiles and runup calculations will be considered. The Government will make the determination when nourishment is required and start the administrative procedure to secure contract funding in consultation with the MDC. An escrow account will be established according to the LCA (Article VI para. 5.c and 5.d) and any MDC funds deposited into the escrow account may be drawn upon to fulfill the MDC's responsibilities for funding their share of the periodic nourishment.

D. MONITORING

The Corps's responsibility for monitoring (which is cost shared with the local sponsor) consists at a minimum, of performing profile surveys in the fall. Any engineering and design costs associated with these surveys, as well as, any contract management costs if the surveys are done under contract are included. The spring periodic inspection by the MDC Superintendent can provide input for the MDC's preparations for the beach season as well as an assessment of winter storm

damage. The fall survey can provide insight to the MDC to enable them to prepare for winter storms as well as provide more comprehensive information on sand movement. It is anticipated that the Corps of Engineers will discuss the results of the fall survey profiles with the MDC represented by the Superintendent during a one day visit and offer maintenance suggestions and/or consider nourishment requirements.

Additional monitoring activities may include sediment sampling for grain size analysis or occasional aerial surveys for use in documenting shoreline changes. Since all monitoring costs are to be cost shared with the local sponsor, annual consultation must occur in advance of the monitoring work to verify funds are available for the proposed work.

APPENDIX A

ENGINEERING REGULATION NO 1110-2-2902

DEPARTMENT OF THE ARMY
U.S. Army Corps of Engineers
Washington, D.C. 20314-1000

ER 1110-2-2902

CEEC-EH-D

Engineer Regulation
No. 1110-2-2902

30 June 1989

Engineering and Design
PRESCRIBED PROCEDURES FOR THE MAINTENANCE AND OPERATION OF SHORE PROTECTION WORKS

1. Purpose. This regulation provides specific performance requirements and guidance for accomplishing the satisfactory maintenance and operation of shore protection works, including coastal structures, beach fill projects, and protective dunes.

2. Applicability. This regulation is applicable to all HQUSACE and field operating activities (FOA) responsible for the planning, design, construction, operation, and maintenance of Civil Works projects on the tidal and Great Lakes shores of the United States, the tidal shores of the Federated States of Micronesia and the Marshall Islands, the Commonwealths of Puerto Rico and Northern Marianas Islands, and the Territories of the United States (U.S. Virgin Islands, Guam, American Somoa). This regulation is applicable for the above purpose to local cooperation agreements (LCA) signed more than 60 days after publication of this regulation in the Federal Register.

3. References.

a. Public Law 79-727, 13 August 1946, as amended

b. Public Law 84-826, 28 July 1956

c. Public Law 87-874, 23October 1962

d. Public Law 89-298, 27 October 1965

e. Public Law 91-611, 31 December 1970

f. Public Law 99-662, 17 November 1986

4. Background. The Federal role in beach erosion control has been defined primarily by Public Law 727, 79th Congress as subsequently amended. The Act provides for Federal assistance in the construction but not the maintenance of work for restoration and protection against wave induced erosion of non-Federal public shores. The law specifies that when the most suitable and economic remedial measure would be provided by periodic beach nourishment, the term "construction" is construed to include the deposit of sand fill at suitable intervals of time. Thus, the Corps, while not responsible for the maintenance of shore protection projects, is involved in the periodic reconstruction or nourishment of many such projects. The Federal participation is conditioned

on non-Federal interest assuring operation, maintenance, replacement, and repair of improvements during the economic life of the project as required to serve the intended purposes. The sponsor of such a project is required to enter into a legally binding agreement with the Secretary of the Army to provide required items of local cooperation and cost sharing (PL 91-611 and PL 99-662).

5. Objective. This regulation prescribes operations, maintenance, inspection, and record keeping procedures required to obtain the intended purposes of shore protection projects.

6. Scope. The Department of the Army will furnish local interest with an operation and maintenance manual for each completed project, or separate useful part thereof, to assist them in carrying out their obligations under these regulations. The efforts prescribed in the following paragraphs should be incorporated into the local operations and maintenance manual and into the planning, design, construction, operation and maintenance, and inspection of all shore protection projects, as applicable.

7. Authority. Section 912(b)(1) of the Water Resources Development Act of 1986 (PL 99-662) amended Section 221 of PL 91-611 to include the following :

"The Secretary may require compliance with any requirements pertaining to cooperation by non-Federal interests in carrying out any water resources project authorized before, on, or after the date of enactment of this Act."

8. Shore protection works; maintenance and operation of structures and facilities.

a. General.

(1) The structures and facilities constructed by or with the financial assistance of the United States for local shore protection and required locally furnished appurtenant facilities shall be maintained and operated in such a manner and for such periods as necessary to obtain the anticipated project benefits.

(2) The agency, which furnished assurances that it will maintain and operate shore protection works in accordance with Federal law, shall appoint a permanent official, hereinafter called the "Superintendent", who shall be directly in charge of an organization responsible for the efficient operation of all of the structures and facilities, and for inspection and maintenance of the project works, all without cost to the United States. The Superintendent may be established from within the existing governmental organization.

(3) The Superintendent will develop a storm emergency plan to cope with storm events greater than the project design storm. The plan should cover measures that minimize the threat to life and damage to property and provide

instructions for an orderly storm recovery effort. Depending on circumstances, it may be desirable to acquire and store certain types of goods, materials, and equipment for evacuation, flood fighting, emergency food, water and sanitary needs, and security.

(4) No other improvement shall be constructed over, under, or through the beach fill or other protective feature, nor shall any excavation or construction be permitted within the limits of the project right-of-way, nor shall any change be made in the project without prior written approval of the District Commander, U.S. Army Corps of Engineers or an authorized representative. Advice regarding the effect of proposed improvements or alterations on the functioning of the project and information concerning methods of construction, acceptable under standard engineering practice, shall be obtained from the District Commander or, if otherwise obtained, shall be submitted for the District Commander's approval. Standard engineering drawings showing such improvements or alterations as finally constructed shall be furnished the District Commander not more than 90 days after completion of the work.

(5) It shall be the duty of the Superintendent to maintain organized records of activities and costs covering maintenance, operation, condition, inspection, repair and replacement of protective works available for the District Commander's or authorized representative's inspection and notation in the Superintendent's offices upon written request.

(6) The District Commander, and authorized representatives, shall have access at all times to all portions of the project.

(7) The Superintendent shall assure that maintenance measures or repairs which the District Commander deems necessary are promptly taken or made. Failure to act within 30 calendar days after receipt of the District Commander's notice may result in the Government completing the work and pursuing a remedy by law as provided in the local agreement contract.

b. Beach berm and foreshore.

(1) Operation. A beach fill project anticipates erosion of the sand directly in front of, or beneath, the beach front development. The rate and extent of erosion depends on the water elevations, storm wave climate, storm durations, and characteristics of the shore material. The level of storm protection obtained will depend on the fill volume in the beach berm and its elevation. During the recreation season, appropriate beach conditions shall be provided to promote and encourage healthful public recreation. The Superintendent should be certain that:

(a) At least one complete survey of profiles (identified in the operations and maintenance manual) is made each year prior to the storm season.

(b) The dry beach width above normal high tide is measured periodically to determine seasonal changes and storm induced sand deficiencies. This is accomplished by direct measurement at predetermined stations along the length of the project and repeated as prescribed in the operation and maintenance manual.

(c) Conditions such as a beach scarp, steepening of the beach face, or the presence of runnels or beach cusps are noted and recorded at each profile during the above surveys.

(d) If the beach berm fails to naturally build back to the minimum cross section within 14 days after the passage of a storm, beach nourishment action is initiated.

(e) No drains discharge onto the beach berm (the intent is to prevent erosion of the beach berm). Health and safety restrictions determine if storm and/or sanitary drains are permitted to discharge into recreational waters.

(f) Sand stockpiles and other resources and equipment required for flood fighting, storm warnings, and evacuations are adequate and maintained in serviceable condition.

(g) Vehicle parking is restricted to parking areas which do not interfere with the function or recreational use of the project.

(2) Maintenance. The Superintendent shall provide such maintenance (excluding periodic nourishment when defined as construction) as is required to insure serviceability of the beach berm and foreshore for erosion control during storms and for recreation during non-storm periods. Measures shall be taken to prevent sand from blowing off the berm onto nearby streets and into gutters and yards. When the berm has narrowed to the point that its protective function is jeopardized, the Superintendent shall initiate action to accomplish maintenance or nourishment of the project. When periodic nourishment is construed as construction for project purposes, such action will be coordinated with the District Commander. Conditions for initiating early nourishment or delaying scheduled nourishment shall be outlined in the operation and maintenance manual. The Superintendent shall insure that:

(a) Prompt action is taken to correct localized, excessive loss or gain of berm cross section beyond that which is allowed in the operations and maintenance manual (this may include grading and reshaping the beach berm in order to move sand from areas of excessive accumulation to areas of depletion); prevent erosion from flanking structures; and placing needed additional sand fill when materials are stockpiled for this purpose.

(b) Devices and/or vegetation used to catch blowing sand are preserved and replaced where needed.

(c) Hazardous conditions are eliminated where possible. Abrupt variations in berm grade are smoothed out and the beach berm and foreshore are kept free of trash and hazardous debris during periods of recreational use. Hazardous conditions which can not be eliminated are clearly marked and isolated from public access to the extent practicable.

c. Protective dune.

(1) Operation. During storm periods, particularly those which are accompanied by abnormal high tides, the storm protection dune may be eroded. The rate and extent of the erosion depends on the height and duration of the storm tide, the beach profile in front of the dune, the extent of vegetative or sand fence stabilization, and characteristics of the material in the dune and berm. The protection provided depends on the volume of material in the dune and its height. To insure satisfactory performance of the storm protection dune, periodic inspections shall be made by the Superintendent to insure maintenance measures are carried out and that:

(a) At least one complete survey of profiles (identified in the operations and maintenance manual) is made each year prior to the storm season.

(b) Post storm surveys are made as required by the operations and maintenance manual.

(c) No action is being taken, such as burning, grazing, or mowing, which is retarding or preventing the growth of vegetation on the dune or promoting erosion on the dune.

(d) No action such as mining of dune sand or degrading the dune is permitted without specific advance written approval of the District Commander.

(e) Encroachments are not made on the dune right-of-way which might hinder its proper functioning during storms or hinder necessary repairs and maintenance.

(f) There is no unauthorized pedestrian or vehicular traffic on the dune and authorized access crossovers are open and safe.

(2) Maintenance. The protective dune (when combined with beach erosion control works) is designed to withstand the project design storm. The protection provided by the dune depends on the crown elevation and the amount and characteristics of sand maintained within the project cross section. Maintenance and repair of the protective dune cross section is a local responsibility. A predetermined minimum cross section must be maintained to obtain the anticipated storm protection benefits. Pedestrian and vehicle traffic on the dune must be limited to the minimum necessary. This requires specific designated crossovers at controlled access points through or over the dune. Areas found to be below minimum grade and which pose a threat to the

integrity of the dune shall be repaired expeditiously and revegetated, if required. The Superintendent will take immediate steps to insure the following maintenance:

(a) Damage to the dune is repaired immediately. Trapping wind blown sand in the dune section by use of devices or, sometimes more effectively, by use of vegetation is appropriate for maintaining the minimum cross section or building a larger cross section.

(b) Designated access walkways and roads over or through the dunes are properly repaired and replaced as needed.

(c) Devices and/or vegetation used to catch blowing sand and stabilize the dune cross section are repaired and replaced as needed.

d. Coastal structures.

(1) Operation. The Superintendent will insure the proper functioning of sand bypass systems, closure structures, and other features requiring operation or adjustment as prescribed in the operations and maintenance manual. The Superintendent shall inspect the structures incorporated into the shore protection project (such as, but not limited to, groins, revetments, seawalls, bulkheads, breakwaters, closure structures, and sand bypassing systems) prior to the storm season, immediately following each major storm, and otherwise at intervals not exceeding 90 days. During such inspections the Superintendent should be certain that:

(a) Post storm condition surveys are made as required by the operations and maintenance manual.

(b) No seepage, saturated areas, piping, or scour are endangering the structure.

(c) No undue settlement has occurred which affects the stability of the structure.

(d) Concrete is not cracking, spalling, or breaking to an extent which might affect the integrity of the structure.

(e) There are no encroachments upon the structure or its right-of-way which might endanger the structure or hinder its function or repair.

(f) Care is being exercised to prevent accumulation of trash and debris adjacent to the structures.

(g) No bank caving, toe scour, or flanking erosion exist which may endanger stability or functioning of the structure.

(h) The drainage systems and mechanical features such as pumps or flood gates are in good working condition.

(i) No excessive loss of materials such as stones or armor units exist that may endanger stability or functioning of the structures.

(j) No floating plant or boats are allowed to lie against or tie up to the structures unless they are designed for such use or it is necessary for repair efforts.

(2) Maintenance. The possibility of one coastal storm closely following another requires that coastal structures, particularly those which provide storm protection, be maintained to the extent practicable in a state of readiness. Measures to eliminate unauthorized encroachments and to effect repairs found necessary by inspection shall be undertaken immediately. All repairs shall be accomplished by methods acceptable to the District Commander or an authorized representative. The Superintendent shall insure the following maintenance is carried out expeditiously:

(a) Causes of seepage, saturated areas, piping, or scour which endanger the stability or functioning of structures are removed.

(b) Areas of undue settlement or material loss are filled.

(c) Cracking, chipping, or breaking of concrete which affects the integrity or functioning of structures is repaired.

(d) Trash and debris adjacent to the structure are removed and disposed of properly.

(e) Bank caving, toe scour, or flanking erosion which endangers structure stability or functioning is remedied.

(f) Drainage systems and mechanical features are repaired or replaced as needed and maintained in working condition.

e. Appurtenant facilities and services. To assure realization of public recreation benefits, certain appurtenant facilities and services are required at local expense, such as: public access, parking areas, and sanitary facilities. The required items are considered self liquidating and therefore not included in the project cost.

(1) Operation. Appurtenant facilities shall be operated to provide safe and healthful public recreation on a nondiscriminatory basis. Facilities should be sized and operated to produce the recreation benefits anticipated for the justification of the project. Those facilities dedicated to support the beach erosion control project shall not be used for conflicting purposes or otherwise diverted without the approval of the District Commander.

(2) Maintenance. The Superintendent shall provide such maintenance as is required to insure safety and serviceability of required public access, parking areas and sanitary facilities during periods of recreational use of the project beach. The facilities shall be inspected 20 to 30 days prior to the recreation season and at least once a month during the recreation season to insure that all required facilities are providing safe, serviceable public use. Proper measures shall be taken to provide for the prompt maintenance or repair of deficiencies noted during such inspections. Violations of public health and building codes shall be treated as evidence of inadequate project maintenance.

9. Compliance. District Commanders shall keep informed as to the extent of compliance with provisions of this regulation and the project Operation and Maintenance Manuals through periodic inspections of the projects, and analysis of project records maintained by the Superintendents. These actions shall be included in the continuing inventory of local cooperation agreements and the status of their performance, transmitted to Congress annually in compliance with Section 221(e) of PL 91-611. The agreements, upon being accepted on behalf of the Secretary of the Army, become enforceable in a court of law. Federal funds are withheld on projects with documented accumulated deficient maintenance. Federal expenditures may be resumed upon correction.

FOR THE COMANDER:

ALBERT J. GENETTI, JR.
Colonel, Corps of Engineers
Chief of Staff

APPENDIX B

LOCAL COOPERATION AGREEMENT

LOCAL COOPERATION AGREEMENT

BETWEEN

THE DEPARTMENT OF THE ARMY

AND

THE COMMONWEALTH OF MASSACHUSETTS

METROPOLITAN DISTRICT COMMISSION

FOR CONSTRUCTION OF THE

REVERE BEACH EROSION CONTROL PROJECT

REVERE, MASSACHUSETTS

THIS AGREEMENT entered into this 31 day of MAY 1990, by and between the DEPARTMENT OF THE ARMY(hereinafter referred to as the "Government"), acting by and through the Assistant Secretary of the Army (Civil Works) and the COMMONWEALTH OF MASSACHUSETTS (hereinafter referred to as the "Local Sponsor"), acting by and through the Metropolitan District Commission.

WITNESSETH THAT:

WHEREAS, construction of the Revere Beach Erosion Control Project at Revere, Massachusetts (hereinafter referred to as the "Project", as defined in Article I of this agreement) was authorized by House Resolution, dated 15 December 1970 and Senate Resolution, dated 17 December 1970, under authority granted by Section 201 of the Flood Control Act of 1965, Public Law 89-298, and

WHEREAS, Section 103 of the Water Resources Development Act of 1986, Public Law 99-662, specifies the cost-sharing requirements applicable to the project; and

WHEREAS, the Local Sponsor has the authority and capability to furnish the cooperation hereinafter set forth and is willing to participate in project cost-sharing and financing in accordance with the terms of this Agreement;

WHEREAS, Section 221 of the Flood Control Act of 1970, Public Law 91-611, as amended, provides that construction of any water resource project by the Secretary of the Army shall not be commenced until each Non-Federal interest has entered into a written agreement to furnish its required cooperation for the project; and,

WHEREAS, The Local Sponsor does not qualify for a reduction of the maximum Non-Federal cost share pursuant to the guidelines which implement Section 103 (M) of The Water Resources Development Act of 1986, Public Law 99-662, published in 33

C.F.R., Sections 241.1 - 6, entitled "Flood Control Cost Sharing Requirements Under The Ability to Pay Provision";

NOW, THEREFORE, the parties agree as follows:

ARTICLE I - DEFINITION AND GENERAL PROVISIONS

For purposes of this Agreement:

a. The term "project" shall mean the placement of sand along 13,000 feet of beach parallel to Revere Beach Boulevard from Eliot Circle to Carey Circle which will include a 50 ft. berm at elevation 18 feet above mean low water and a one foot vertical to 15 feet horizontal sloping section extending seaward from the top of the berm to the existing beach, or approximately 300 feet, of which 185 feet is above the mean high water line as generally described in the General Design Memorandum dated August 1985 (Revised June 1986) and approved August 1986.

b. The term "total cost of initial construction" shall mean all costs incurred by the Local Sponsor and the Government directly related to the initial construction. Such costs shall include, but not necessarily be limited to, actual construction costs, costs of applicable engineering and design, continuing planning and engineering costs incurred after October 1, 1985, supervision and administration costs, costs of contract dispute settlements or awards, and the value of lands, easements, and rights-of-way, relocations, and dredged material disposal areas provided by the Local Sponsor for the initial construction, but shall not include any costs for betterments or operation, maintenance, repair, replacement or rehabilitation of the seawall.

c. The term "beach monitoring" shall mean the monitoring of the beach after initial construction. A monitoring program of the beach is required to determine when future nourishment must be accomplished to maintain the design level of protection. Beach monitoring consists of beach profile and aerial surveys, sediment sampling, engineering and design, and supervision and administration. The monitoring shall be performed annually by the Government.

d. The term "periodic beach nourishment" shall mean the contract implementation and placement of sand on the beach following the completion of initial construction at such intervals of time during the 50 year period following completion of initial construction as are determined appropriate by the Government in cooperation with the Local Sponsor. Materials furnished for renourishment will be of a quality equal to the original construction materials. Periodic beach nourishment will be based on an average annual loss of approximately 3,000 cubic yards of sand as generally described in the General Design Memorandum dated August 1985 (Revised June 1986) and approved August 1986. Periodic beach nourishment will be undertaken each year unless, based on an annual joint inspection and information gathered during the beach monitoring program, the Goverment and Local Sponsor determines that such beach nourishment is not engineeringly necessary or economically justified at that time.

e. The term "cost of beach monitoring" shall mean all costs incurred by the Local Sponsor and the Government directly related to beach monitoring for a period of 50 years from the date of completion of initial construction.

f. The term "authorized periodic beach nourishment period" shall mean the authorized Federal participation in project beach nourishment for a period of 50 years from the date of completion of initial construction.

g. The term "period of initial construction" shall mean the time from the advertisement of the first construction contract to the time of acceptance of the completed initial construction work by the Contracting Officer.

h. The term "cost of periodic beach nourishment" shall mean all costs incurred by the Local Sponsor and the Government directly related to periodic nourishment of the Project for the 50 year period following the completion of the initial construction.

i. The term "Contracting Officer" shall mean the Commander of the U.S. Army Engineer Division, New England Division, or his designee.

j. The term "Highway" shall mean any highway, thoroughfare, roadway, street, or other public or private road or way.

k. The term "Relocations" shall mean alterations, modifications, lowering or raising in place, and/or new construction related to, but not limited to, existing: railroads, highways, bridges, railroad bridges and approaches thereto, buildings, pipelines, public utilities (such as municipal water and sanitary sewer lines, telephone lines, and storm drains), aerial utilities, cemeteries, and other facilities, structures, and improvements determined by the Government to be necessary for the construction, operation and maintenance of the Project.

l. The term "Fiscal Year" shall mean one fiscal year of the United States Government, unless otherwise specifically indicated. The Government fiscal year begins on October 1 and ends on September 30.

m. The term "involuntary Acquisition" shall mean the acquisition of lands, easements, and right-of-way by eminent domain.

n. The term "Functional Portion of the Project" shall mean a completed portion of the Project as determined by the Contracting Officer to be suitable for tender to the Local Sponsor to operate and maintain in advance of completion of construction of the entire Project.

ARTICLE II - OBLIGATIONS OF PARTIES

a. The Government, subject to and using funds provided by the Local Sponsor and appropriated by the Congress, shall expeditiously construct the project, (including relocations of railroad bridges and approaches thereto), applying those procedures usually followed or applied in Federal projects, pursuant to Federal laws, regulations, and policies. The Local Sponsor shall be afforded the opportunity to review and comment on all contracts, including relevant plans and specifications, prior to the issuance of invitations for bid. To the extent possible, the Local Sponsor will be afforded the opportunity to review and comment on all modifications and change orders in excess of $25,000 prior to the issuance to the contractor of a Notice to

Proceed. The Government will consider the comments of the Local Sponsor, but award of the contracts modification or change orders and performance of all work on the Project (whether the work is performed under contract or by Government personnel), shall be exclusively within the control of the Government.

b. When the Government determines that the project, or functional element of the Project, is complete, the Government shall turn the project or functional portion over to the Local Sponsor, which shall accept the project or functional portion and be solely responsible for operating, repairing, maintaining, replacing and rehabilitating the Project or functional portion in accordance with Article VIII hereof.

c. As further specified in Article VI hereof, the Local Sponsor shall provide, during the period of initial construction, a contribution equal to 35 percent of the total cost of initial construction.

d. As further specified in Article III hereof, the Local Sponsor shall provide all lands, easements, rights-of- way, and dredged material disposal areas, and perform all relocations, (excluding railroad bridges and approaches thereto), determined by the Government to be necessary for construction, operation, maintenance of the project.

e. If the value of creditable contributions provided for initial construction under paragraph d. of this Article represents less than 35 percent of total cost of initial construction, the Local Sponsor shall provide, in accordance with Article VI of this Agreement, an additional cash contribution in the amount necessary to make its total contribution equal to 35 percent of total cost of initial construction.

f. The Local Sponsor shall also contribute, in cash, for a period of 50 years after the initial construction is completed 35 percent of the cost of annual beach monitoring and 35 percent of the cost of periodic beach nourishment. The Local Sponsor's share of the cost of periodic beach nourishment and beach monitoring is estimated to be $25,100 annually. Such contributions shall be made annually as further specified in Article VI.

g. The Government shall pay 65 percent of the costs of periodic beach nourishment required for storm damage reduction purposes.

h. The Local Sponsor, to the extent of their legal authority, shall assure that water pollution that would endanger the health of bathers will not be permitted.

i. The Local Sponsor shall provide and maintain necessary access roads, parking areas and other public use facilities open and available to all on equal terms.

j. The Local Sponsor shall assure continued conditions of public ownership and use of the shore upon which the amount of Federal participation is based during the economic life of the Project.

k. The Local Sponsor shall, to the extent of its powers, prescribe and enforce regulations to prevent the obstruction of or encroachment on the project that would reduce the level of protection it affords or that would hinder operation or maintenance.

l. No Federal funds may be used to meet the Local Sponsor's share of project costs under this Agreement unless the expenditure of such funds is expressly authorized by statute, as verified in writing by the granting agency.

ARTICLE III - LANDS, FACILITIES, AND PUBLIC LAW 91-646 RELOCATION ASSISTANCE

a. The Local Sponsor shall furnish to the Government all lands, easements, and rights-of-way, including suitable borrow and dredged material disposal areas, as may be determined by the Government to be necessary for the construction, operation, and maintenance of the Project, and shall furnish to the Government evidence supporting the Local Sponsor's legal authority to grant rights-of-entry to such lands. The necessary lands, easements, and rights-of-way may be provided incrementally, but all lands, easements, and rights-of-way determined by the Government to be necessary for work to be performed under a construction contract must be furnished prior to the advertisement of the construction contract.

b. The Local Sponsor shall provide or pay to the Government the cost of providing all retaining dikes, wasteweirs, bulkheads, and embankments, including all monitoring features and stilling basins, that may be required at any dredged material disposal areas necessary for construction of the project.

c. Upon notification from the Government, the Local Sponsor shall accomplish or arrange for accomplishment at no cost to the Government all alterations and relocations (excluding railroad bridges and approaches thereto) determined by the Government to be necessary for construction of the project.

d. The Local Sponsor shall comply with the applicable provisions of the Uniform Relocations Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, as amended by Title IV of The Surface Transportation and Uniform Relocation Assistance Act of 1987 (Public Law 100-17), and in The Uniform Regulations contained in 49 CFR Part 24, in acquiring lands, easements and rights-of-way for construction and subsequent operation and maintenance of the project and inform all affected persons of applicable benefits, policies, and procedures in connection with said Act.

ARTICLE IV - VALUE OF LANDS AND FACILITIES

a. The value of the lands, easements, and rights-of-way to be included in total project costs and credited toward the Local Sponsor's share of said costs will be determined in accordance with the following procedures:

1. If the lands, easements, or rights-of-way are owned by the Local Sponsor as of the date the first construction contract for the project is awarded, the credit shall be the fair market value of the interest at the time of such award. The fair market value shall be determined by an appraisal, to be obtained by the Local Sponsor, which has been prepared by a qualified appraiser who is acceptable to both the Local Sponsor and the Government. The appraisal shall be reviewed and approved by the Government.

2. If the lands, easements, or rights-of-way are to be acquired by the Local Sponsor after the date of award of the first construction contract for the project, the credit shall be the fair market value of the interest at the time such interest is acquired . The fair market value shall be determined as specified in article IV. a.1. of this agreement . If the Local Sponsor pays an amount in excess of the appraised fair market value, it may be entitled to a credit for the excess if the Local Sponsor has secured prior written approval from the Government of its offer to purchase such interest.

3. If the Local Sponsor acquires more lands, easements, or rights-of-way than are necessary for project purposes, as determined by the Government, then only the value of such portions of those acquisitions as are necessary for project purposes shall be included in total project costs and credited to the Local Sponsor's share.

4. Credit for lands, easements, and rights-of-way in the case of involuntary acquisitions which occur within a one-year period preceding the date this Agreement is signed or which occur after the date this Agreement is signed will be based on court awards, or on stipulated settlements that have received prior Government approval.

5. Credit for lands, easements, or rights-or-way acquired by the Local Sponsor within a five-year period preceding the date this Agreement is signed, or any time after this Agreement is signed, will also include the actual incidental costs of acquiring the interest, e.g., closing and title costs, appraisal costs, survey costs, attorney's fees, plat maps, and mapping costs, as well as the actual amounts expended for payments of any Public Law 91-646 relocation assistance benefits provided in accordance with the obligations under this Agreement.

b. The costs of relocations which will be included in total project costs of initial construction and credited towards the Local Sponsor's share of total project costs shall be that portion of the actual costs as set forth below, and approved by the Government:

1. Highways and Highway Bridges: Only that portion of the cost as would be necessary to construct substitute bridges and highways to the design standard that the Commonwealth of Massachusetts would use in constructing a new bridge or highway under similar conditions of geography and traffic loads.

2. Utilities and Facilities (Including Railroads): Actual relocation costs, less depreciation, less salvage value, plus the cost of removal, less the cost of betterments. With respect to betterments, new materials shall not be used in any relocation or alteration if materials of value and usability equal to those in the existing facility are available or can be obtained as salvage from the existing facility or otherwise, unless the provision of new material is more economical. If despite the availability of used material, new material is used, where the use of such new material represents an additional cost, such cost shall not be included in costs of initial construction.

ARTICLE V - CONSTRUCTION PHASING AND MANAGEMENT

a. To provide for consistent and effective communication between the Local Sponsor and the Government during the period of construction, the Local Sponsor and the Government shall appoint representatives to coordinate on scheduling, plans, specifications, modifications, contract costs, and other matters relating to construction of the project. The Local Sponsor will be informed of any changes in cost estimates.

b. The representatives appointed above shall meet as necessary during the period of construction and shall make such recommendations as they deem warranted to the Contracting Officer.

c. The Contracting Officer shall consider the recommendations of the representatives in all matters relating to construction to the Project, but the Contracting Officer, having ultimate responsibility for construction of the Project, has complete discretion to accept, reject, or modify the recommendations.

ARTICLE VI - METHOD OF PAYMENT

a. The Local Sponsor shall provide, during the period of initial construction, the amounts required under Article II of this Agreement. Cost of the initial construction is presently estimated to be $10,900,000. In order to meet it's share of the cost of initial construction, the Local Sponsor must provide a cash contribution presently estimated to be $3,815,000. The dollar amounts set forth in this article are based upon the Government's best estimates which will reflect projection of costs, price level changes, and anticipated inflation. Such cost estimates are subject to adjustments based upon cost actually incurred and are not to be construed as the total financial responsibilities of the Government and the Local Sponsor.

b. The Local Sponsor shall provide its required cash contribution in accordance with the following provisions:

1. The Government shall notify the Local Sponsor, prior to the signing of this agreement, of its estimated share of the total cost of initial construction, including it's share of costs attributable to the Project incurred prior to the initiation of construction, for the first fiscal year of initial construction. No later than 60 calendar days after the Government and the Local Sponsor have signed this agreement, the Local Sponsor shall verify to the satisfaction of the Government that it has deposited the requisite amount in an escrow account acceptable to the Government, with interest accruing to the Local Sponsor.

2. For the second and subsequent fiscal years of project initial construction, the Government shall, no later than 90 calendar days prior to the beginning of the fiscal year, notify the Local Sponsor of its share of the total project costs for that fiscal year. No later than the beginning of the fiscal year, the Local Sponsor shall make the necessary funds available to the Government through the funding mechanism specified in Article VI. b.1. of this Agreement . As construction of the project proceeds, the Government shall adjust the amounts required to be provided under this paragraph to reflect actual costs.

3. If at any time during the period of initial construction the Government determines that additional funds will be needed from the Local Sponsor, the Government shall so notify the Local Sponsor and the Local Sponsor, no later than 90 calendar days from receipt of notice, shall make the necessary funds available through the funding mechanism specified in Article VI. b.1. of his agreement.

4. The Government will draw on the escrow account provided by the Local Sponsor such sums as the Government deems necessary to cover contractual and in-house fiscal obligations attributable to the Project as they are incurred, as well as costs incurred by the Government prior to initiation of initial construction.

5. Upon completion of the initial construction and resolution of all relevant contract claims and appeals, the Government shall compute total costs of initial construction and tender to the Local Sponsor a final accounting of the Local Sponsor's share of initial construction costs. In the event that the total contribution by the Local Sponsor is less than its minimum required share of the initial construction costs the Local Sponsor shall, no later than 90 calendar days after receipt of written notice, make a cash payment to the Government of whatever sum is required to meet its minimum required share of initial construction costs. In the event the Local Sponsor has made total contributions in excess of its required share of the initial construction costs, the Government shall at the option of the Local Sponsor,within 90 days of the final accounting subject to the availability of funds, return part or all of said excess funds to the Local Sponsor or place part or all said excess funds into an escrow account for periodic beach nourishment.

c. The Local Sponsor shall provide, for a period of 50 years after the date of completion of initial project construction, a cash contribution equal to 35 percent of the estimated annual cost of periodic beach nourishment and beach monitoring currently estimated to be $25,100. No later than October 1 of each year, the Local Sponsor shall make the necessary funds available to the Government through an escrow agreement acceptable to the Government with interest accruing to the Local Sponsor.

d. Upon completion of each periodic beach nourishment operation and resolution of all relevant contract claims and appeals, the Government shall compute the total cost of said nourishment and tender to the Local Sponsor a final accounting of its share of beach nourishment costs. In the event the total contribution by the Local Sponsor is less than its required share of the cost of said periodic nourishment at the time of the final accounting, the Local Sponsor shall, within 90 calendar days after receipt of written notice, make a cash payment to the Government for whatever sum is required to meet its minimum required share of the cost of said periodic beach nourishment. In the event the Local Sponsor has made contributions in excess of its share of costs for periodic beach nourishment, the Government shall at the option of the Local Sponsor, within 90 days of the final accounting for the periodic nourishment subject to the availability of funds, return part or all of said excess funds to the Local Sponsor or keep part or all of said excess funds within the escrow account for periodic beach nourishment.

ARTICLE VII - DISPUTES

Before any party to this Agreement may bring suit in any court concerning an issue relating to this Agreement, such party must first seek in good faith to resolve the issue through negotiation or other forms of non-binding alternative dispute resolution mutually acceptable to the parties.

ARTICLE VIII - OPERATION, MAINTENANCE, REPLACEMENT AND REHABILITATION

a. After the Government has turned the completed Project, or functional portion of the project, over to the Local Sponsor, the Local Sponsor shall operate, maintain, repair, replace, and rehabilitate the completed Project, or functional portion of the Project in accordance with regulations or directions prescribed by the Government.

b. The Local Sponsor hereby gives the Government a right to enter, at reasonable times and in a reasonable manner, upon land which it owns or controls for access to the Project for the purpose of inspection, and, if necessary, for the purpose of completing, operating, repairing, maintaining, replacing, or rehabilitating the Project. If an inspection shows that the Local Sponsor for any reason is failing to fulfill its obligations under this Agreement without receiving prior written approval from the Government, the Government will send a written notice to the Local Sponsor. If the Local Sponsor persists in such failure for 30 calendar days after receipt of the notice, then the Government shall have a right to enter, at reasonable times and in a reasonable manner, upon lands the Local Sponsor owns or controls for access to the Project for the purpose of completing, operating, repairing, maintaining, replacing, or rehabilitating the Project. No completion, operation, repair, maintenance, replacement, or rehabilitation by the Government shall operate to relieve the Local Sponsor of responsibility to meet its obligations as set forth in this Agreement, or to preclude the Government from pursuing any other remedy at law or equity to assure faithful performance pursuant to this Agreement.

ARTICLE IX - RELEASE OF CLAIMS

The Local Sponsor shall hold and save the Government free from all damages arising from the construction, operation and maintenance of the Project, except for damages due to the fault or negligence of the Government or its contractors.

ARTICLE X - MAINTENANCE OF RECORDS

The Government and the Local Sponsor shall keep books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to this Agreement to the extent and in such detail as will properly reflect total project costs. The Government and the Local Sponsor shall maintain such books, records, documents, and other evidence for a minimum of three years after completion of construction of the Project and resolution of all claims arising therefrom, and shall make available at their offices at reasonable times, such books, records, documents, and other evidence for inspection and audit by authorized representatives of the parties to this Agreement.

ARTICLE XI - GOVERNMENT AUDIT

The Government shall conduct an audit when appropriate of the Local Sponsor's records for the Project to ascertain the allowability, reasonableness, and allocability of its costs for inclusion as credit against the non-Federal share of project costs.

ARTICLE XII - FEDERAL AND STATE LAWS

In acting under its rights and obligations hereunder, the Local Sponsor agrees to comply with all applicable Federal and State laws and regulations, including Section 601 of Title VI of the Civil Rights Act of 1964 (Public Law 88- 352) and Department of Defense Directive 5500.II issued pursuant thereto and published in Part 300 of Title 32, Code of Federal Regulations, as well as Army Regulation 600-7, entitled "Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army."

ARTICLE XIII - RELATIONSHIP OF PARTIES

The parties to this Agreement act in an independent capacity in the performance of their respective functions under this Agreement, and neither party is to be considered the officer, agent, or employee of the other.

ARTICLE XIV- OFFICIALS NOT TO BENEFIT

No member of or delegate to the Congress, or resident commissioner, shall be admitted to any share or part of this Agreement, or to any benefit that may arise therefrom.

ARTICLE XV - COVENANT AGAINST CONTINGENT FEES

The Local Sponsor warrants that no person or selling agency has been employed or retained to solicit or secure this Agreement upon agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employees or bona fide established commercial or selling agencies maintained by the Local Sponsor for the purpose of securing business. For breach or violation of this warranty, the Government shall have the right to annul this Agreement without liability, or, in its discretion, to add to the Agreement or consideration, or otherwise recover, the full amount of such commission, percentage, brokerage, or contingent fee.

ARTICLE XVI - TERMINATION OR SUSPENSION

a. If at any time the Local Sponsor fails to make the payments required under this Agreement, the Secretary of the Army shall terminate or suspend work on the project until the Local Sponsor is no longer in arrears, unless the Secretary of the Army determines that continuation of work on the project is in the interest of the United States, or is necessary in order to satisfy agreements with any other non-Federal interests in connection with the Project. Any delinquent payment shall be charged interest at a rate, to be determined by the Secretary of the Treasury, equal to 150 per centum of the average bond equivalent rate of the 13-week Treasury bills auctioned immediately prior to the date on which such payment became delinquent, or auctioned immediately prior to the beginning of each additional 3-month period if the period of delinquency exceeds 3 months.

b. If the Government fails to receive annual appropriations for the Project in amounts sufficient to meet project expenditures for the then-current or upcoming fiscal year, the Government shall so notify the Local Sponsor. After 60 calendar days either party may elect without penalty to terminate this Agreement or to defer future performance hereunder; however, deferral of future performance under this Agreement shall not affect existing obligations or relieve the parties of liability for any obligations previously incurred. In the event that either party elects to terminate this Agreement pursuant to this Article, both parties shall conclude their activities relating to the Project and proceed to a final accounting in accordance with Article VI of this Agreement. In the event either party elects to defer future performance under this Agreement pursuant to this Article, such deferral shall remain in effect until such time as the Government receives sufficient appropriations or until either party elects to terminate this Agreement.

ARTICLE XVII - OBLIGATION OF FUTURE APPROPRIATIONS

Nothing herein shall constitute, or be deemed to constitute, an obligation of future appropriations by the legislature of the Commonwealth of Massachusetts.

ARTICLE XVIII - NOTICES

a. All notices, requests, demands, and other communications required or permitted to be given under this Agreement shall be deemed to have been duly given if in writing and delivered personally, given by prepaid telegram, or mailed by first-class (postage-prepaid), registered, or certified mail, as follows:

If to the Local Sponsor:

Metropolitan District Commission
20 Somerset Street
Boston, Massachusetts 02108

If to the Government:

Division Engineer
New England Division, Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02254-9149

b. A party may change the address to which such communications are to be directed by giving written notice to the other in the manner provided in this Article.

c. Any notice, request, demand, or other communication made pursuant to this Article shall be deemed to have been received by the addressee at such time as it is personally delivered or after it is mailed, as the case may be.

ARTICLE XIX - CONFIDENTIALITY

To the extent permitted by the law governing each party, the parties agree to maintain the confidentiality of exchanged information when requested to do so by the providing party.

ARTICLE X X - HAZARDOUS WASTE

a. After execution of this Agreement and upon direction by the Contracting Officer, the Local Sponsor shall perform, or cause to be performed, such environmental investigations as are determined necessary by the Government or the Local Sponsor to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). 42 USC 9601-9675, on lands necessary for project construction, operation, and maintenance. All actual costs incurred by the Local Sponsor which are properly allowable and allocable to performance of any such environmental investigations shall be included in total project costs and cost shared as a construction cost in accordance with Section 103 of Public Law 99-662.

b. In the event it is discovered through an environmental investigation or other means that any lands, easements, rights-of-way, or disposal areas to be acquired or provided for the Project contain any hazardous substances regulated under CERCLA, the Local Sponsor and the Government shall provide prompt notice to each other, and

the Local Sponsor shall not proceed with the acquisition of lands, easements, rights-of-way, or disposal areas until mutually agreed.

c. The Government and the Local Sponsor, shall determine whether to initiate construction of the Project, or if already in construction, to continue with construction of the Project, or to terminate construction of the Project for the convenience of the Government in any case where hazardous substances regulated under CERCLA are found to exist on any lands necessary for the projects. Should the Government and the Local Sponsor determine to proceed or continue with construction after considering any liability that may arise under CERCLA, as between the Government and the Local Sponsor, the Local Sponsor shall be solely responsible for any and all necessary clean up and response costs, to include the costs of any studies and investigations necessary to determine the extent of and appropriate response to the contamination. Such costs shall not be considered a part of total project costs as defined in this Agreement. In the event the Local Sponsor fails to provide any funds necessary to pay for clean up and response costs or to otherwise discharge its responsibilities under this paragraph upon direction by the Government, the Government may either terminate or suspend work on the Project or proceed with further work as provided in Article XVII.

d. The Local Sponsor and the Government shall consult with each other under the Construction Phasing and Management Article of this Agreement to assure that responsible parties bear any necessary cleanup and response costs as defined in CERCLA. Any decision made pursuant to paragraph c of this Article shall not relieve any party from any liability that may arise under CERCLA.

e. The Local Sponsor shall operate, maintain, repair, replace, and rehabilitate the Project in a manner so that liability will not arise under CERCLA.

ARTICLE XXI -CONDITION FOR CONSTRUCTION

Prior to award of the initial construction contract, the Local Sponsor will procure any and all permits required by local, state and Federal laws or regulations.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement which shall become effective upon the date it is signed by the Assistant Secretary of the Army (Civil Works).

THE DEPARTMENT OF THE ARMY

By:

ROBERT W. PAGE
Assistant Secretary of
the Army
(Civil Works)

Date: 31 MAY 1990

COMMONWEALTH
OF MASSACHUSETTS
METROPOLITAN DISTRICT
COMMISSION

By:

As Com

as Comm

as Comm.

Date: May 31, 1990

CERTIFICATE OF AUTHORITY

I, James M. Shannon, do hereby certify that I am Attorney General of the Commonwealth of Massachusetts and that the Metropolitan District Commission is a legally constituted public body with full authority and legal capability to perform the terms of the Agreement between the Department of the Army and the Commonwealth of Massachusetts in connection with the Revere Beach Erosion Control Project, and to pay damages, if necessary in the event of failure to perform in accordance with Section 221 of Public Law 91-611, and that the persons who have executed the Agreement on behalf of the Metropolitan District Commission have acted within their statutory authority.

IN WITNESS WHEREOF, I have made and executed this certificate this fourth day of June, 1990.

Attorney General of the Commonwealth

CERTIFICATION OF AUTHORITY

I, William F. Chisholm, do hereby certify that I am Secretary of the Metropolitan District Commission named herein; that M. Ilyas Bhatti, Dwight M. Scandrett, William J. Jones, John J. Whelan, _____, who signed this agreement on behalf of the Metropolitan District Commission, were then and there duly appointed and qualified Commissioners of the Metropolitan District Commission, that said agreement was duly signed for and on behalf of the Metropolitan District Commission, by virtue of their authority as Commissioners of the Metropolitan District Commission and is within the scope of their statutory powers. IN WITNESS WHEREOF, I have hereunto affixed my hand and seal of the M.D.C. this 31st day of May 1990.

William F. Chisholm

Secretary
Metropolitan District Commission

CERTIFICATION REGARDING LOBBYING

The undersigned certifies, to the best of his or her knowledge and belief that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form - LLL, *"Disclosure Form to Report Lobbying," in accordance with its instructions.*

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, Title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

M. Ilyas Bhatti
Commissioner
Metropolitan District Commission

APPENDIX C

INSPECTION REPORT FORMS
AND
SURVEY SHEETS

INSPECTION FORM
BEACH FILL & APPURTENTANT FACILITIES
REVERE BEACH, REVERE, MA

DATE OF INSPECTION : _____
MM/DD/YY

COMMENTS

1. TYPE OF INSPECTION
- ☐ Annual
- ☐ Post Storm
- ☐ Other (Comment)

Numbers 2.-12. below are based on visual inspection. Where necessary qualify your response. Stationing is that as shown on the as built drawings (Appendix D).

2. EROSION ..... ☐ YES ☐ NO
Sta. _____ To Sta. _____
Estimated Vol. (cy) _____

3. ACCRETION ..... ☐ YES ☐ NO
Sta. _____ To Sta. _____
Estimated Vol. (cy) _____

4. HAS AN ESCARPMENT DEVELOPED ..... ☐ YES ☐ NO
Sta. _____ To Sta. _____
Height (Feet) _____

5. OVERTOPPING OF BERM
During High Water..... ☐ YES ☐ NO
Sta. _____ To Sta. _____
Date _____ Time _____
Distance of debris line from wall (Feet) _____

6. HAS ENCROACHMENT OCCURRED..... ☐ YES ☐ NO
was CE NEW ENGLAND DIVISON
approval obtained ..... ☐ YES ☐ NO

Date of Approval: _____

Unauthorized (Comment)..... ☐ YES ☐ NO
Type:Construction ..... ☐ YES ☐ NO
Vehicular..... ☐ YES ☐ NO
Pedestrian..... ☐ YES ☐ NO

7. BEACH CLEANLINESS..... ☐ Good ☐ Fair ☐ Poor

Are Rubbish/Trash Receptacles Available.... ☐ YES ☐ NO
Are Lifeguards At The Site During The Recreation Season ....
..... ☐ YES ☐ NO
Date of latest Water Quality
Test: _____ (Comment on Results).

8. CONDITION OF PARKING AREA ☐ Good ☐ Fair ☐ Poor
Is Access Freely Available..... ☐ YES ☐ NO

INSPECTION FORM
BEACH FILL & APPURTENTANT FACILITIES
REVERE BEACH, REVERE, MA

9. CONDITION OF SEA WALL . . . . ☐ Good ☐ Fair ☐ Poor

10. OTHER DAMAGE (Comment). . . . . ☐ YES ☐ NO

11. PHOTOGRAPHS ATTACHED. . . . . ☐ YES ☐ NO
If Not, Please Explain Why Not.

12. WAS MAINTENANCE PERFORMED SINCE THE LAST INSPECTION . . . . . ☐ YES ☐ NO
If, Yes, Describe Manintenance, Date Performed and show changes on each profile

13. MEASUREMENTS CONDUCTED . . . . . ☐ YES ☐ NO

Date Measurements Taken _____
MM/DD/YY

Time Measurements Taken _____
AM/PM

Comparison to Last Measurement:

	Last * Measurement		Current * Measurement	
STA-0+20	A=	B=	A=	B=
STA 13+95	A=	B=	A=	B=
STA 41+00	A=	B=	A=	B=
STA 53+17.	A=	B=	A=	B=
STA 64+00	A=	B=	A=	B=
STA 100+00	A=	B=	A=	B=
STA 122+00	A=	B=	A=	B=
STA 134+50	A=	B=	A=	B=
STA _____	A=	B=	A=	B=
STA _____	A=	B=	A=	B=

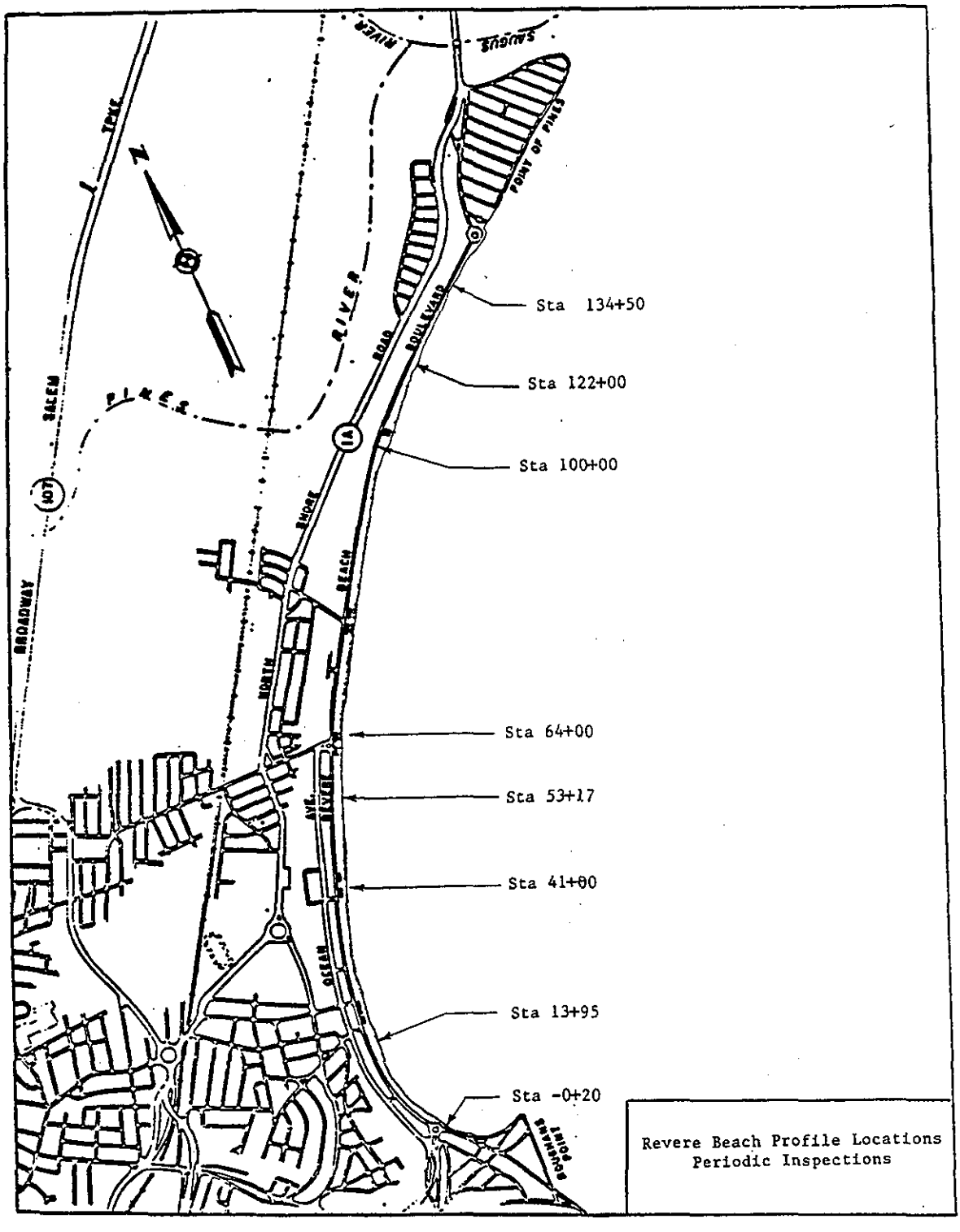
* See Figure 9 for definition of A & B

COMMENTS

REPORT:

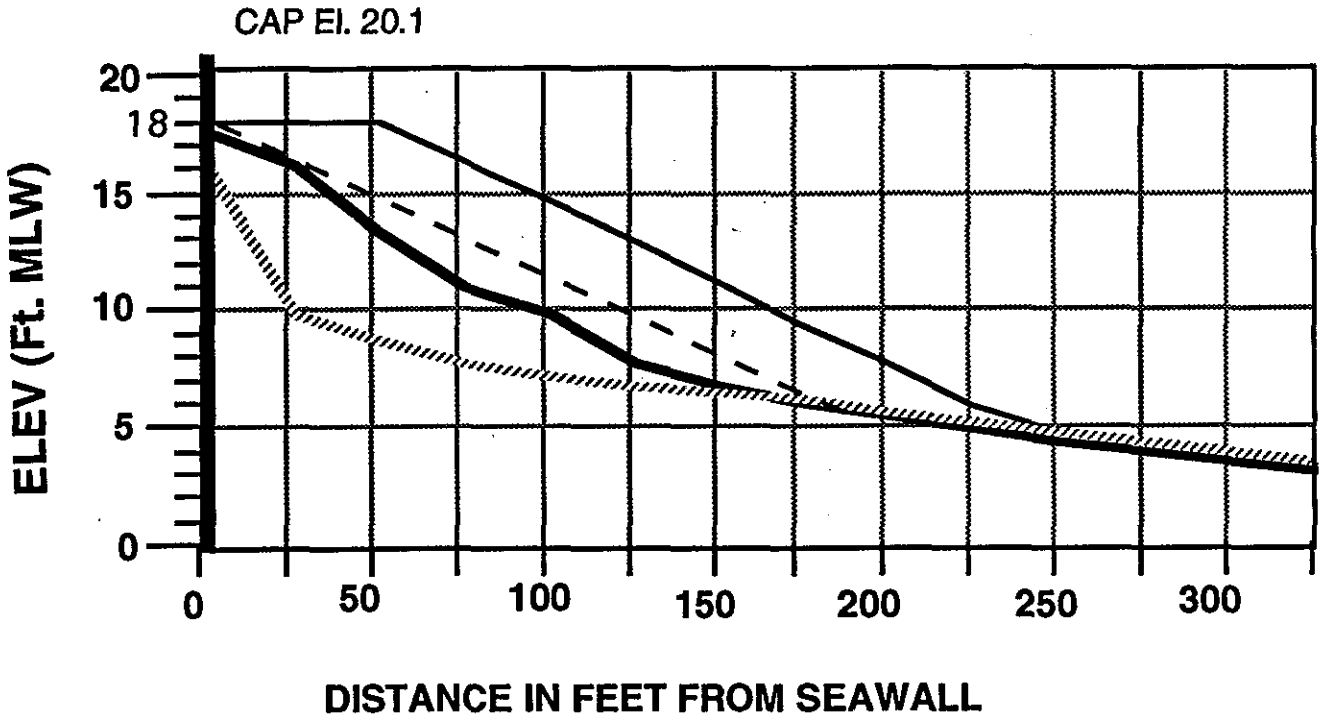
Prepared by: _____
Type or Print Name

Submitted by: _____ _____ _____
Type Name and Title | Signature | Date


Sta 134+50
Sta 122+00
Sta 100+00
Sta 64+00
Sta 53+17
Sta 41+00
Sta 13+95
Sta -0+20
Revere Beach Profile Locations
Periodic Inspections

REVERE BEACH PROFILE STA. -0+20
Elliot Circle

Similar from Sta. -3+70 to 4+00, **770 LF**

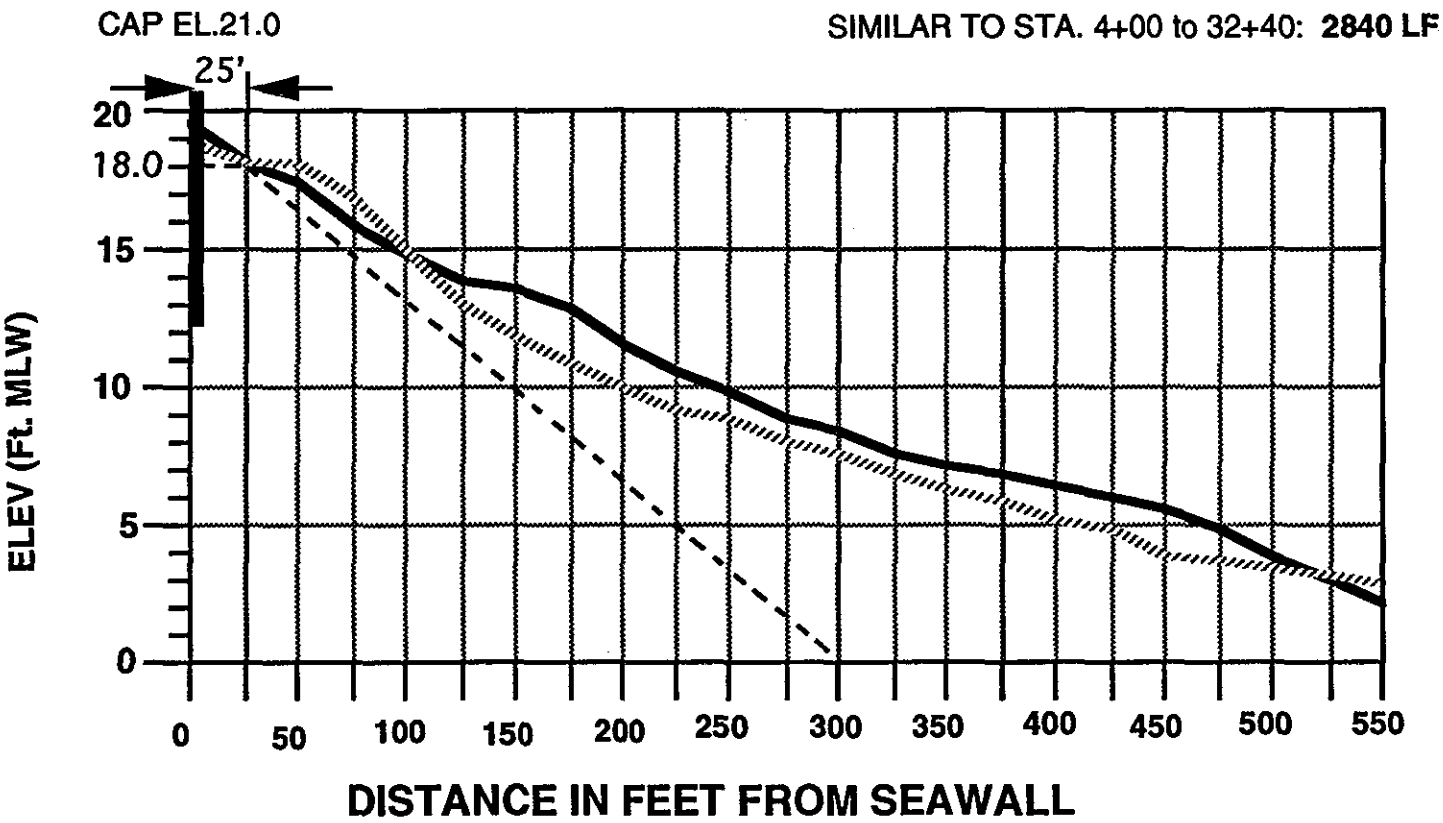


LEGEND:

//// 1987 ASSUMED — DESIGN BUILT 1/91 — 11/18/91 SURVEY - - - MINIMUM REQUIRED BEACH

FIGURE 1

REVERE BEACH PROFILE STA. 13+95
Crescent Beach



LEGEND:

87 ASSUMED

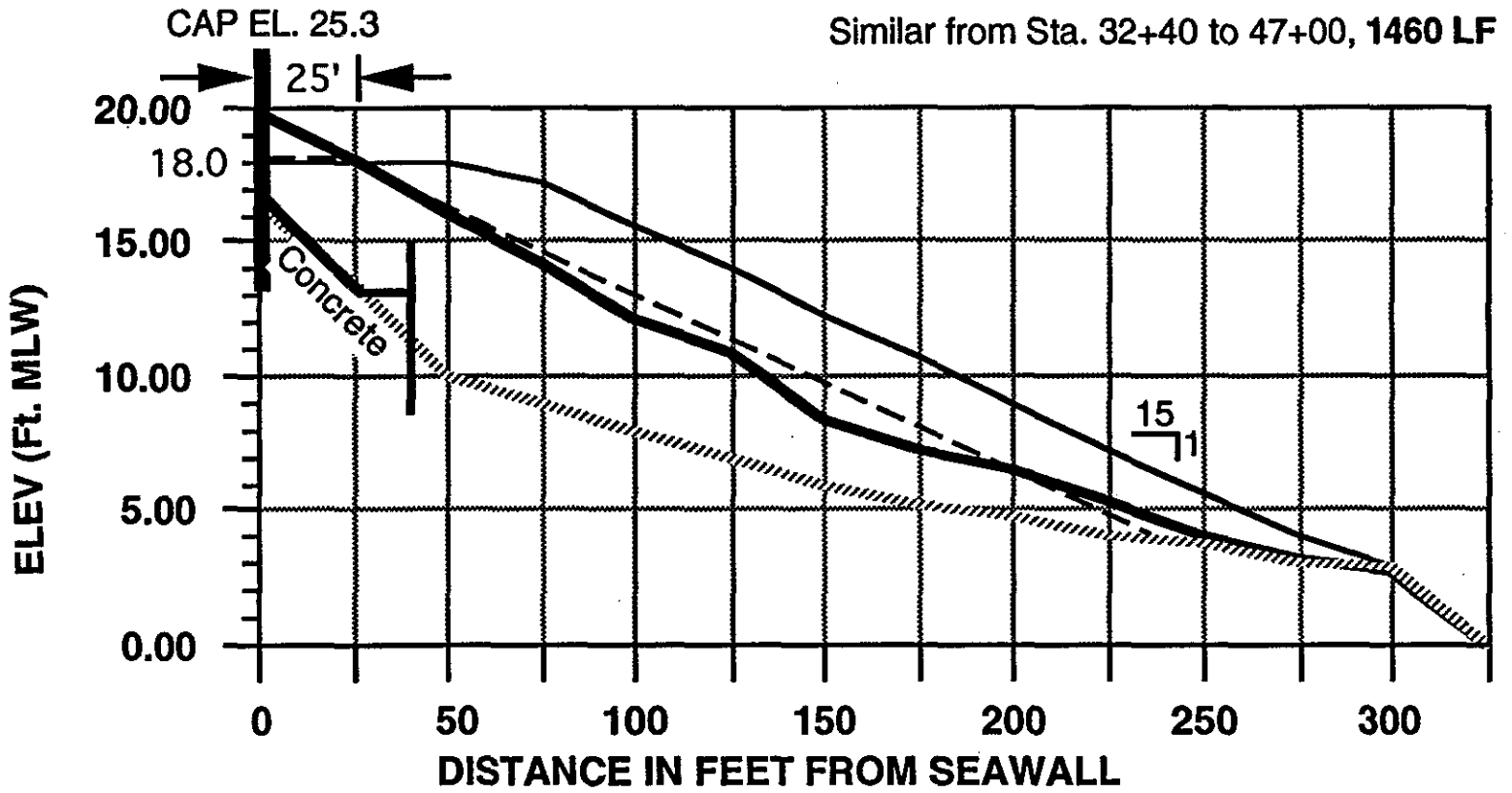
DESIGN BUILT 1/91

11/18/91 SURVEY

MIN. REQ'D BEACH

FIGURE 2

REVERE BEACH PROFILE
STA. 41+00 Police Station Pavillion



LEGEND:

1987 ASSUMED

MIN. REQ'D BEACH

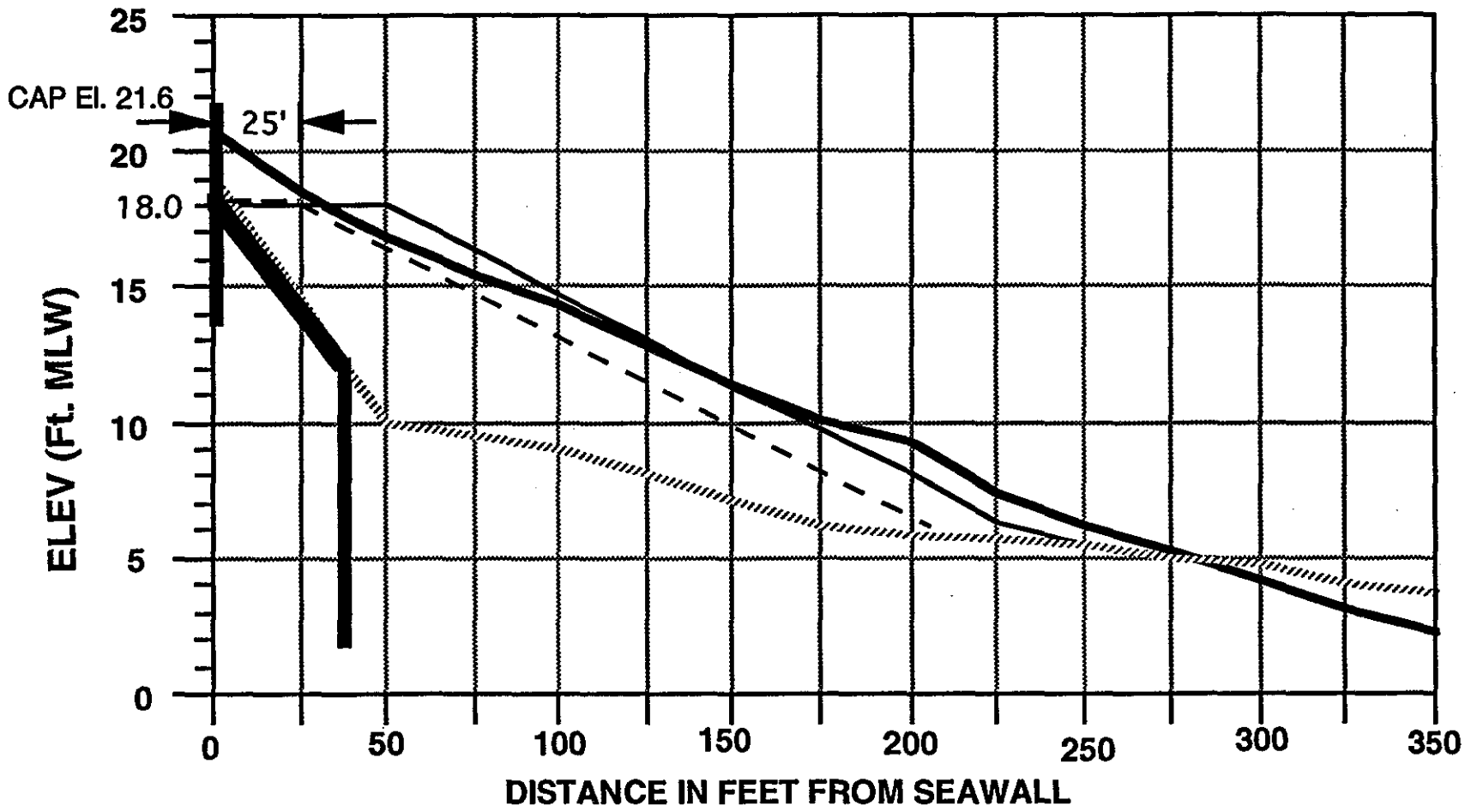
DESIGN BUILT 6/91

11/18/91 SURVEY

FIGURE 3

REVERE BEACH PROFILE STA. 53+17
North of Police Station to Revere St.

Similar from Sta. 47+00 to 59+05, **1,205 LF**



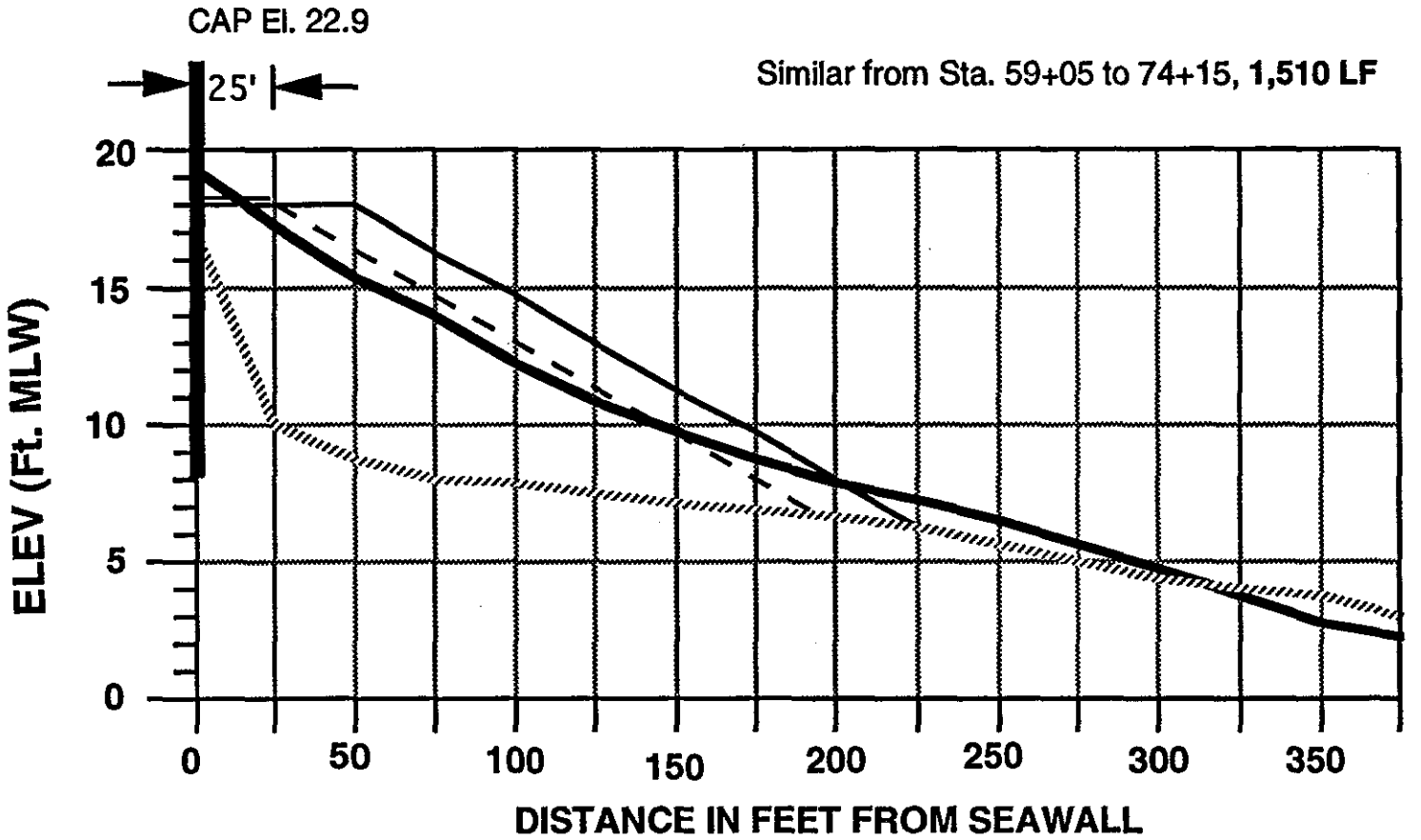
LEGEND:

1987 ASSUMED — DESIGN — 11/18/91 SURVEY BUILT 6/91

MIN. REQ'D BEACH

FIGURE 4

REVERE BEACH PROFILE STA. 64+00
30' South to 955' North of Revere Street Pavillion



LEGEND:

1987 ASSUMED

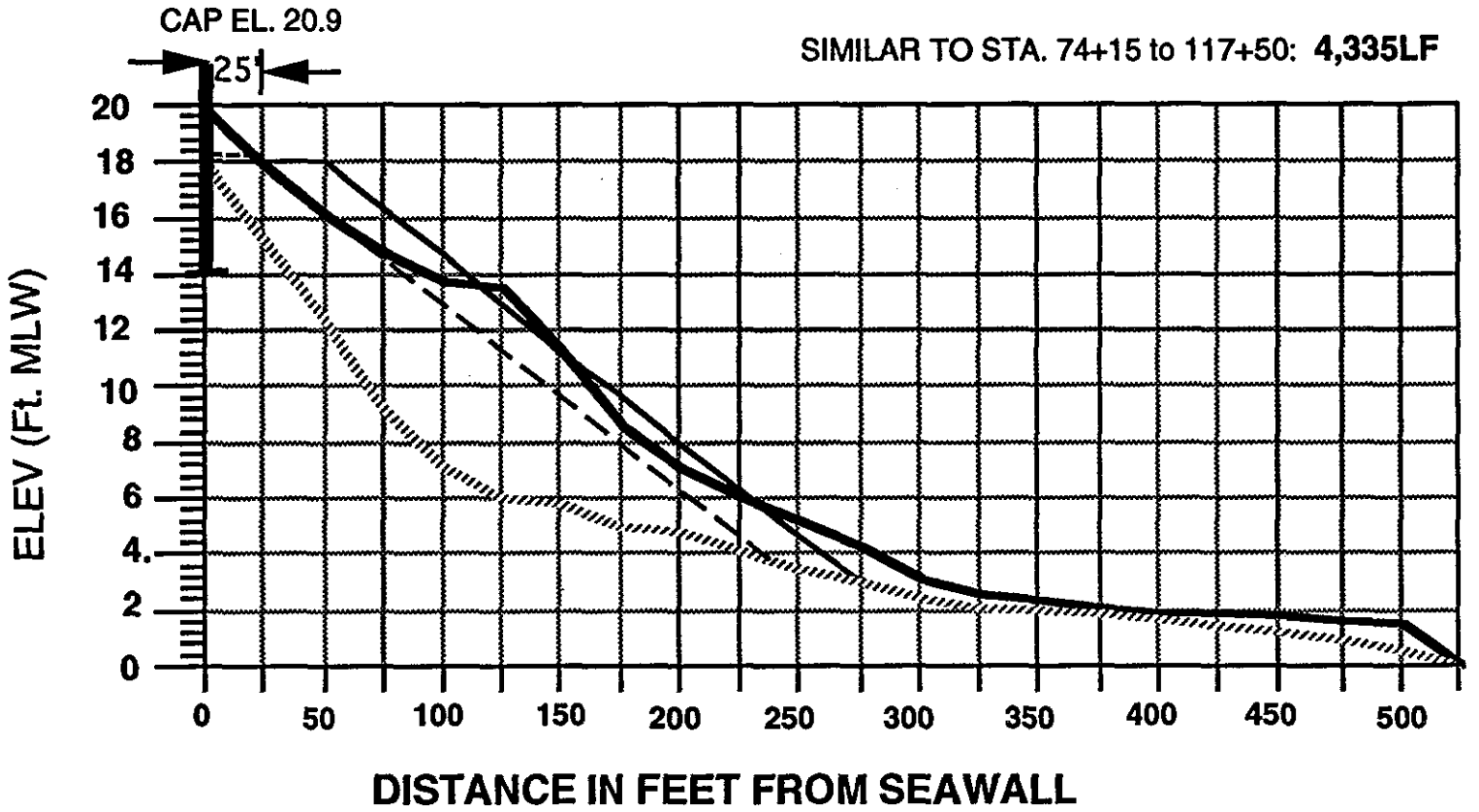
DESIGN BUILT 6/91

11/18/91 SURVEY

MIN. REQ'D BEACH

FIGURE 5

REVERE BEACH PROFILE STA. 100+00
Center of North Half of Beach (Oak Is. St. Pav. to Near North Sanitary)



LEGEND:

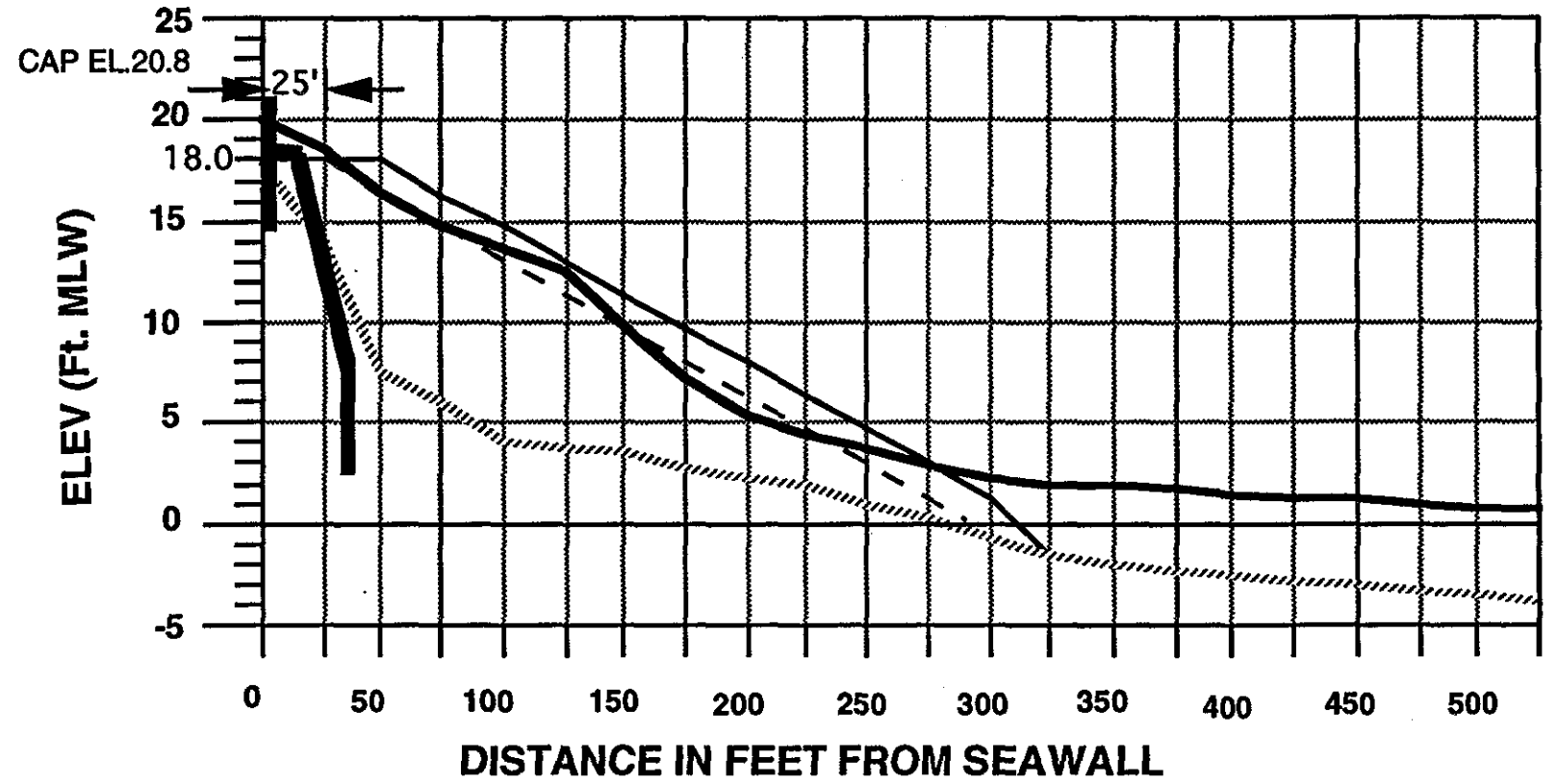
1987 ASSUMED — DESIGN BUILT 6/91 — 11/18/91 SURVEY

MIN. REQ'D BEACH

FIGURE 6

REVERE BEACH PROFILE STA. 122+00
Concrete Steps at North End of Beach

SIMILAR TO STA. 117+00 to 132+00: **1,500 LF**



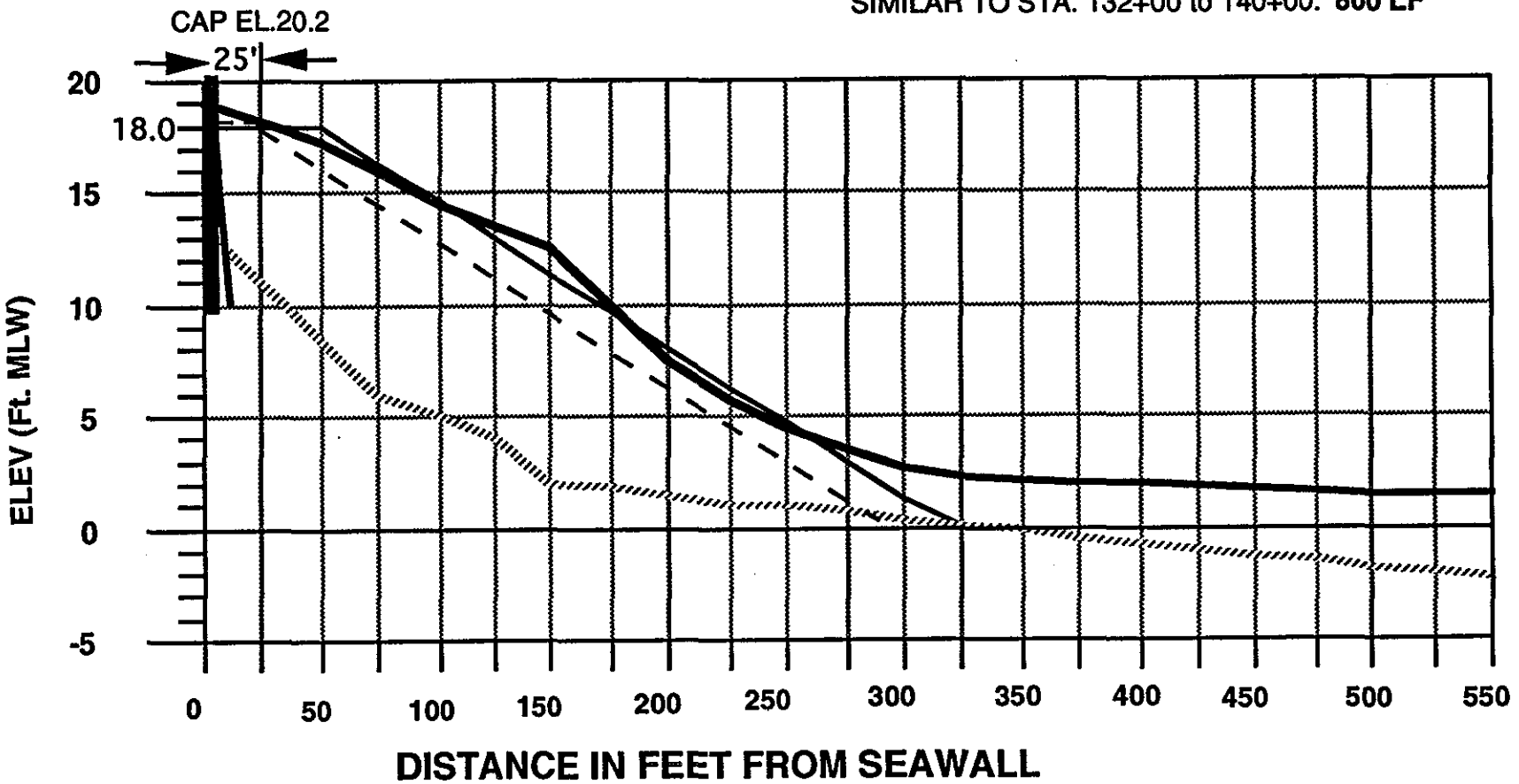
LEGEND:

1987 ASSUMED
MIN. REQ'D BEACH
DESIGN BUILT 7/91
11/18/91 SURVEY

FIGURE 7

REVERE BEACH PROFILE STA. 134+50
North Buttress Wall

SIMILAR TO STA. 132+00 to 140+00: **800 LF**



LEGEND:

1987 ASSUMED

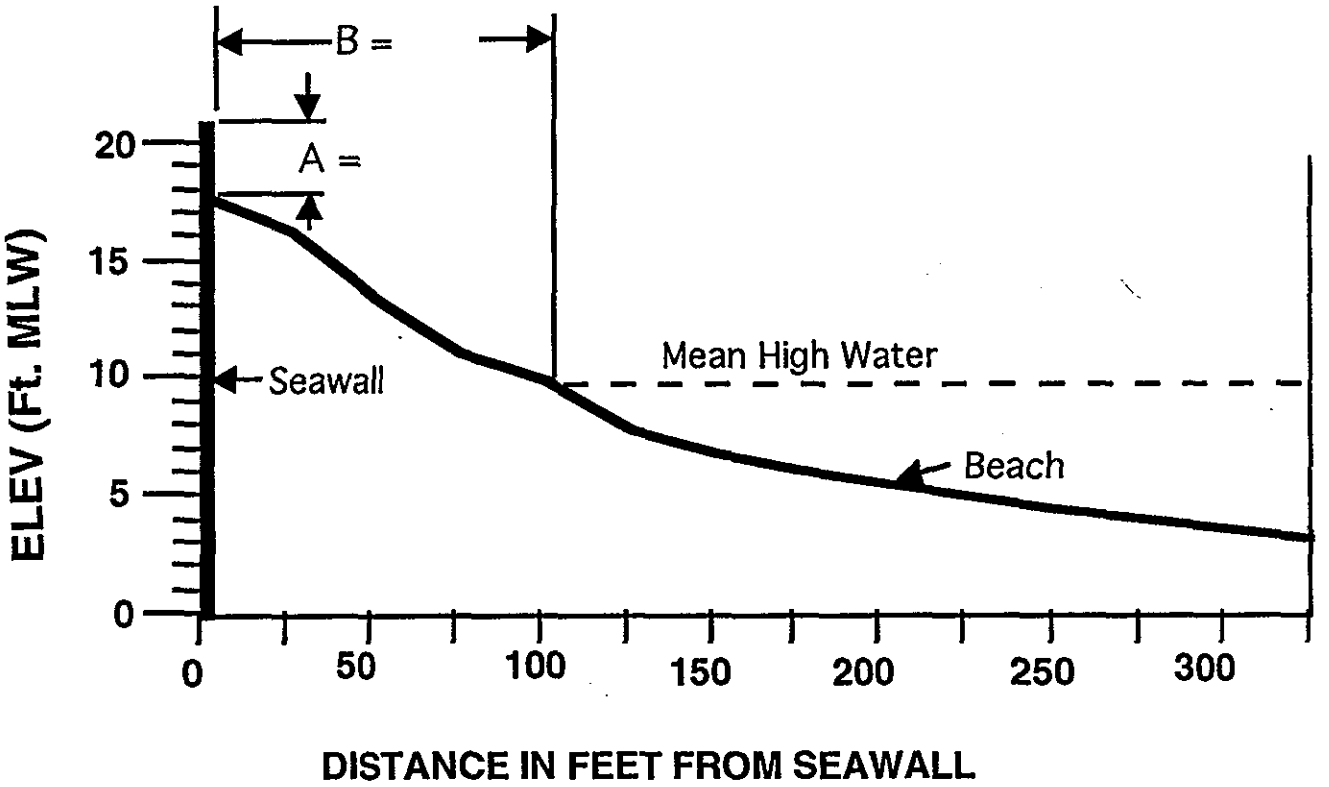
DESIGN BUILT 7/91

11/18/91 SURVEY

MIN. REQ'D BEACH

FIGURE 8

Periodic Inspection Profile



Legend:

A = Height of seawall above beach.

B = Distance from seawall to Mean High Water with predicted Boston tide at about M H W, elevation 9.5 feet, MLW.

FIGURE 9

DESIGNATION OF SUPERINTENDENT

Name of Project: _____

Location: _____

MAINTAINING MUNICIPAL AGENCY:

Agency: _____

Address: _____ Tel. No. _____

"SUPERINTENDENT"

Name & Title: _____

Employed By: _____

Business Address: _____

Business Tel. No.: _____

Nights, Sundays, Address: _____

Nights, Sundays, Tel. No.: _____

Remarks:

Signed _____

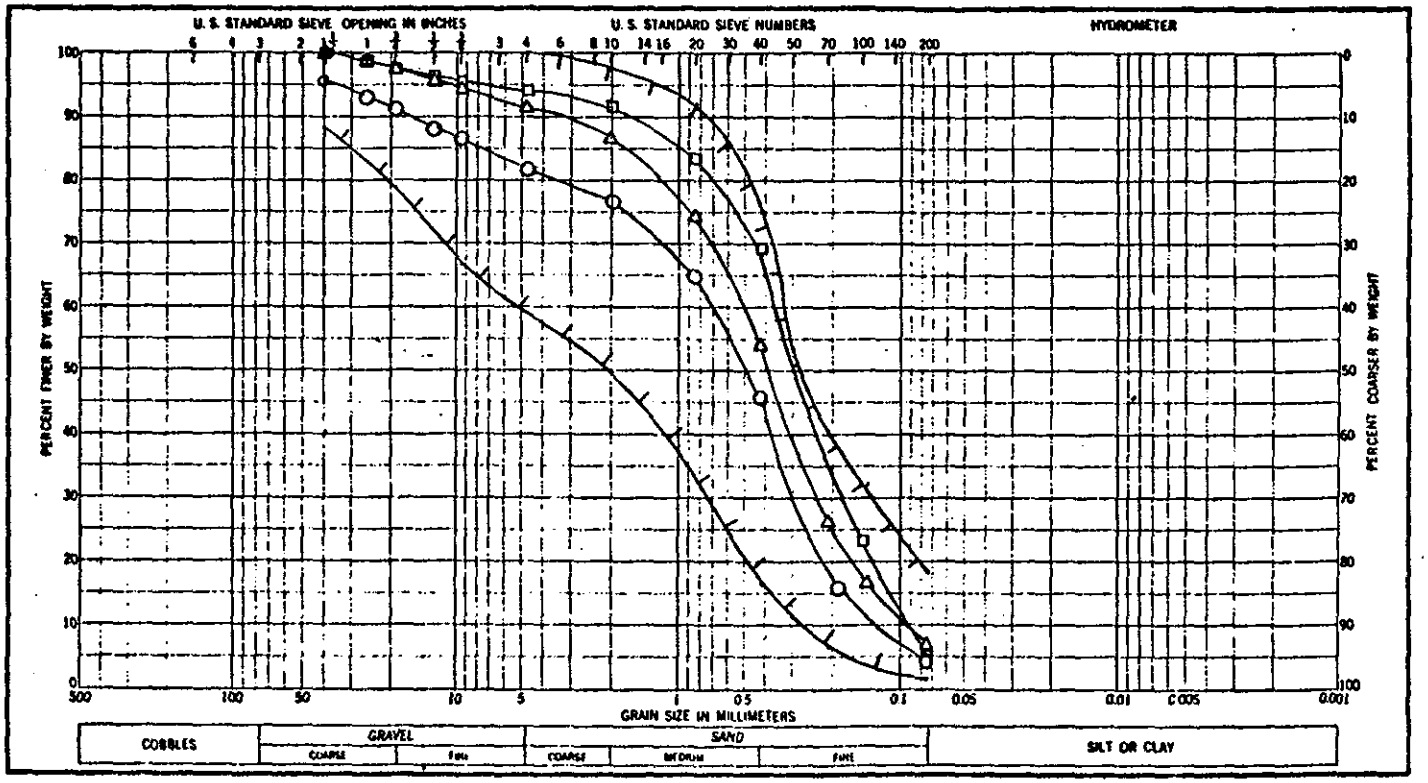
Title _____

Date _____

NOTE: To be submitted and updated as necessary by the responsible agency which will maintain and operate the works in accordance with regulations prescribed by the Secretary of the Army,

APPENDIX D

AS-BUILT DRAWINGS



LEGEND

- △ NOVEMBER 1984 SPLIT SPOON SAMPLES TAKEN BY USACE (31 SAMPLES).
- □ SEPTEMBER 1979 BAG SAMPLES TAKEN BY STATE OF MASSACHUSETTS (5 SAMPLES).
- ○ APRIL 1969 BAG SAMPLES TAKEN BY STATE OF MASSACHUSETTS (4 SAMPLES).
- ⊥ LIMITS OF ALL SAMPLES TAKEN.

COMPOSITE GRADATIONS

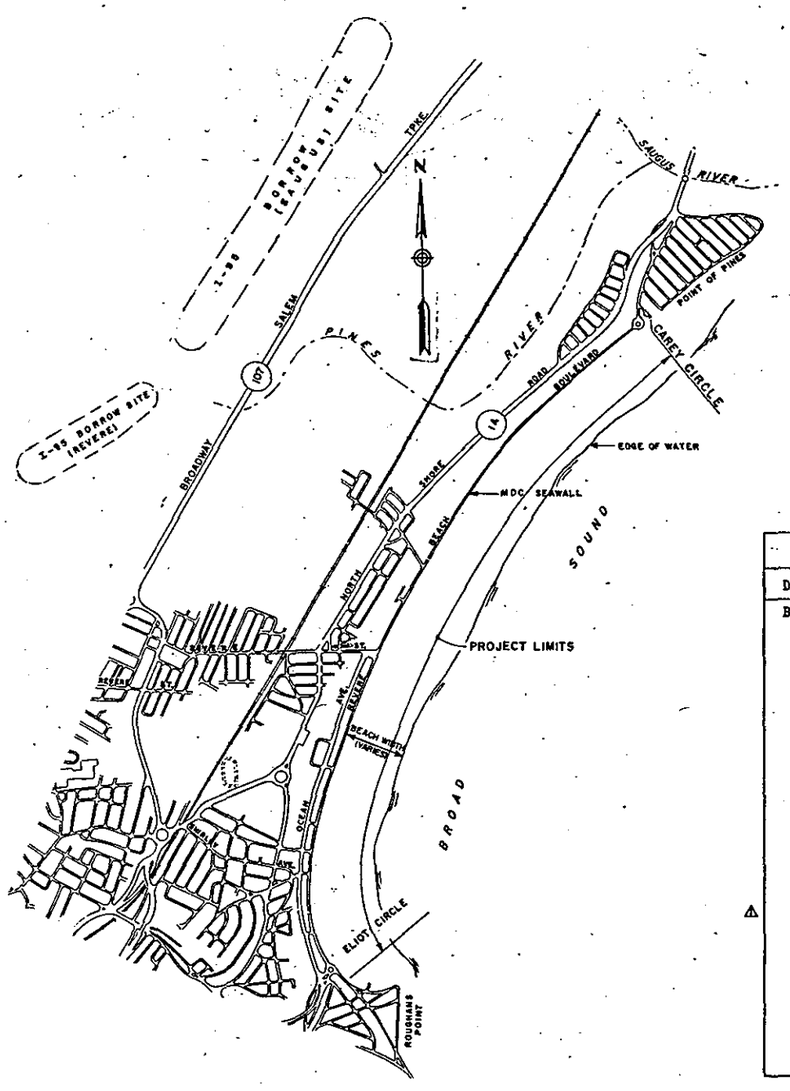
ROUTE I-95 EMBANKMENT

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS

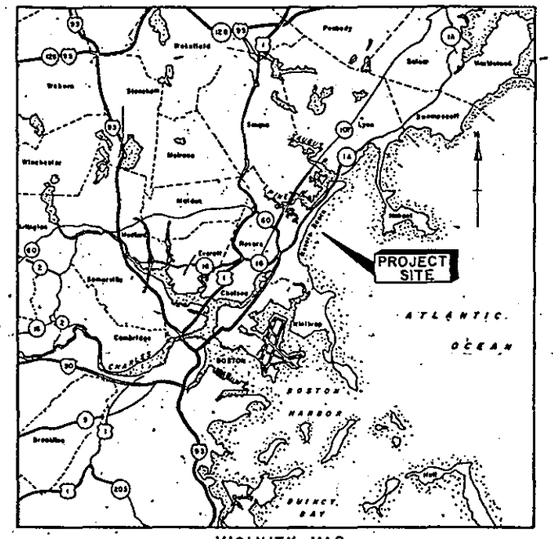
P.S. DES. BY	REVERE BEACH
P.S. DR. BY	COMPOSITE GRADATIONS
CK. BY	ROUTE I-95 EMBANKMENT

GEOTECH. ENG. BR. SCALE: NA
PLATE NO. B-5 DATE: 28 MAY 85

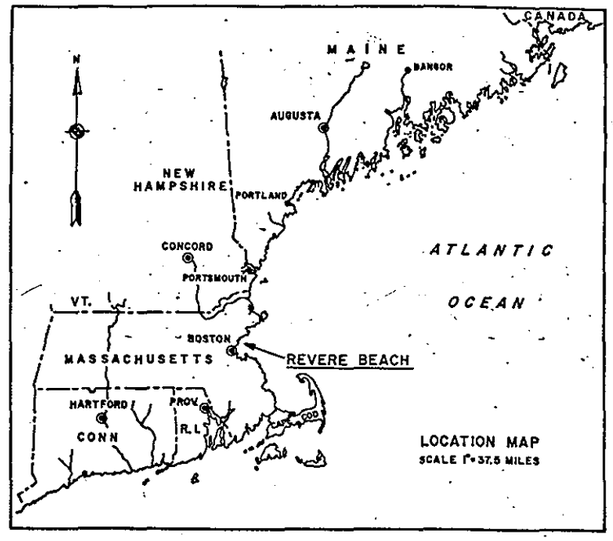
CORPS OF ENGINEERS — U. S. ARMY



PROJECT SITE PLAN
N.T.S.



VICINITY MAP
SCALE: 1" = APPROX. 1.9 MILES



LOCATION MAP
SCALE 1" = 37.5 MILES

INDEX TO DRAWINGS

Drawing No.	Sheet No.	Title
B.E. MASS-63	1 OF 16	PROJECT SITE PLAN AND INDEX
"	2 OF 16	SANDFILL PLAN - ELIOT CIRCLE TO STA.34+00
"	3 OF 16	SANDFILL PLAN - STA.34+00 TO REVERE STREET PAVILION; STA.67+40
"	4 OF 16	SANDFILL PLAN - REVERE STREET PAVILION; STA.67+40 TO STA.99+74
"	5 OF 16	SANDFILL PLAN - STA.100+00 TO STA.133+38
"	6 OF 16	SANDFILL PLAN - STA.133+38 TO CAREY CIRCLE
"	7 OF 16	SANDFILL PROFILES - STA.-3+17 TO STA.53+17
"	8 OF 16	SANDFILL PROFILES - STA.58+50 TO STA.115+90
"	9 OF 16	SANDFILL PROFILES - STA.119+10 TO STA.145+00
"	10 OF 16	HAUL ROUTE
"	11A OF 16	BORROW AREA - STA.201+00 TO STA.211+00
"	11 OF 16	BORROW AREA - STA.205+00 TO STA.235+00
"	12 OF 16	BORROW AREA - STA.235+00 TO STA.270+50
"	13 OF 16	BORROW AREA - STA.270+50 TO STA.290+50
"	14 OF 16	BORROW AREA - STA.290+50 TO STA.305+50
"	15 OF 16	BORROW AREA SECTIONS
"	16 OF 16	DETAILS

GENERAL NOTES:

Soundings are in feet and tenths and are referred to the plane of Mean Low Water (M.L.W.).

Beach profiles and shoreline structures are from a survey dated, June 1987; Fieldbook No. 687

Coordinates are based on the Lambert Grid System for the Commonwealth of Massachusetts. N.A.D. 1927.

"The information depicted on these maps represents the results of surveys made on the dates indicated, and can only be considered as indicating the general conditions existing at that time."

VALUE ENGINEERING PAYS DIVIDENDS

SAFETY PAYS

GRAPHIC SCALES
1" = 37.5 MI. 25 0 25 50 75 MI.
1" = APPROX. 1.9 MI. 1 0 1 2 3 4 MI.

As Built Drawing
Contract No. DACW 33900-0098

REVISION	DATE	DESCRIPTION	BY
⚠	3-20-91	SHEET 11A ADDED. (REVISED BORROW AREA)	

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

DES. BY J.R. | DR. BY R.F.S. | CK. BY W.T.C.

SUBMITTED: PROJECT MANAGER

REVIEWED: CHIEF, COAST. ENGINEER BR.

APPROVAL RECOMMENDED: CHIEF, DESIGN DIVISION

APPROVED: DIRECTOR OF ENGINEERING — DATE JULY 1990

REVERE BEACH, MASSACHUSETTS
BEACH EROSION CONTROL PROJECT
PROJECT SITE PLAN AND INDEX

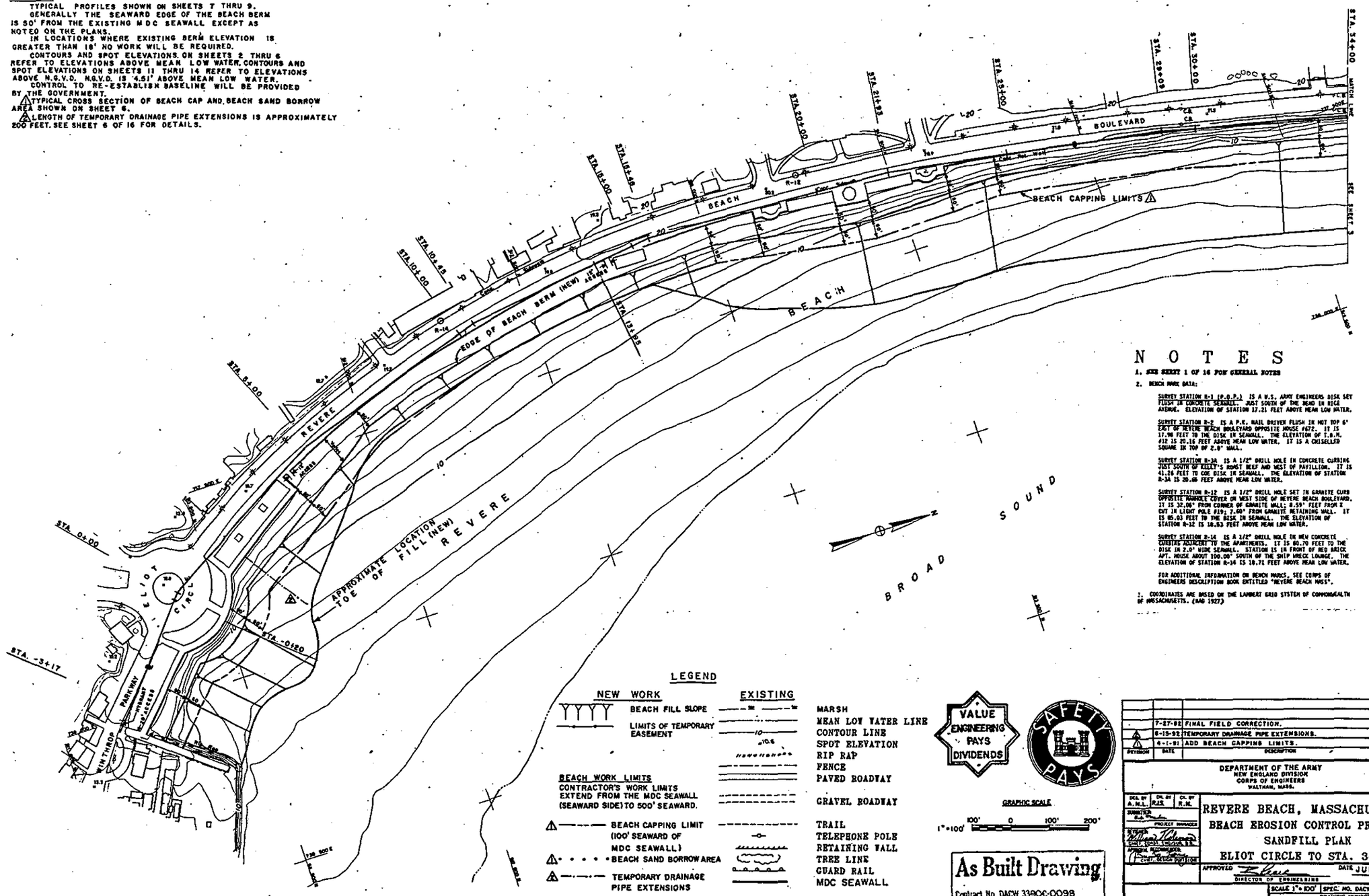
SCALE: AS SHOWN | SPEC NO. DACW-33-90-B-0094

DRAWING NUMBER
B.E. MASS.-63

SHEET 1 OF 16

CORPS OF ENGINEERS — U. S. ARMY

NOTE:
TYPICAL PROFILES SHOWN ON SHEETS 7 THRU 9.
GENERALLY THE SEAWARD EDGE OF THE BEACH BERM IS 50' FROM THE EXISTING M.D.C. SEAWALL EXCEPT AS NOTED ON THE PLANS.
IN LOCATIONS WHERE EXISTING BERM ELEVATION IS GREATER THAN 18' NO WORK WILL BE REQUIRED.
CONTOURS AND SPOT ELEVATIONS ON SHEETS 2 THRU 6 REFER TO ELEVATIONS ABOVE MEAN LOW WATER. CONTOURS AND SPOT ELEVATIONS ON SHEETS 11 THRU 14 REFER TO ELEVATIONS ABOVE N.G.V.D. N.G.V.D. IS 4.51' ABOVE MEAN LOW WATER.
CONTROL TO RE-ESTABLISH BASELINE WILL BE PROVIDED BY THE GOVERNMENT.
⚠ TYPICAL CROSS SECTION OF BEACH CAP AND BEACH SAND BORROW AREA SHOWN ON SHEET 6.
⚠ LENGTH OF TEMPORARY DRAINAGE PIPE EXTENSIONS IS APPROXIMATELY 200 FEET. SEE SHEET 6 OF 16 FOR DETAILS.



N O T E S

A. SEE SHEET 1 OF 16 FOR GENERAL NOTES

2. BENCH MARK DATA:

SURVEY STATION R-1 (P.O.P.) IS A U.S. ARMY ENGINEERS DISK SET FLUSH IN CONCRETE SEAWALL. JUST SOUTH OF THE BEND IN RICE AVENUE. ELEVATION OF STATION 17.21 FEET ABOVE MEAN LOW WATER.

SURVEY STATION R-2 IS A P.K. NAIL DRIVER FLUSH IN HOT TOP 6' EAST OF REVERE BEACH BOULEVARD OPPOSITE HOUSE #672. IT IS 17.98 FEET TO THE DISK IN SEAWALL. THE ELEVATION OF T.B.M. #12 IS 20.16 FEET ABOVE MEAN LOW WATER. IT IS A CHISELLED SQUARE IN TOP OF 2.8" WALL.

SURVEY STATION R-3A IS A 1/2" DRILL HOLE IN CONCRETE CURBING JUST SOUTH OF KELLY'S ROAST BEEF AND WEST OF PAVILION. IT IS 41.26 FEET TO CORE DISK IN SEAWALL. THE ELEVATION OF STATION R-3A IS 20.66 FEET ABOVE MEAN LOW WATER.

SURVEY STATION R-12 IS A 1/2" DRILL HOLE SET IN GRANITE CURB OPPOSITE MANHOLE COVER ON WEST SIDE OF REVERE BEACH BOULEVARD. IT IS 32.06' FROM CORNER OF GRANITE WALL; 8.59' FEET FROM X CUT IN LIGHT POLE #19; 7.60' FROM GRANITE RETAINING WALL. IT IS 85.03 FEET TO THE DISK IN SEAWALL. THE ELEVATION OF STATION R-12 IS 18.53 FEET ABOVE MEAN LOW WATER.

SURVEY STATION R-14 IS A 1/2" DRILL HOLE IN NEW CONCRETE CURBING ADJACENT TO THE APARTMENTS. IT IS 80.70 FEET TO THE DISK IN 2.0' WIDE SEAWALL. STATION IS IN FRONT OF RED BRICK APT. HOUSE ABOUT 100.00' SOUTH OF THE SHIP WRECK LOUNGE. THE ELEVATION OF STATION R-14 IS 18.71 FEET ABOVE MEAN LOW WATER.

FOR ADDITIONAL INFORMATION ON BENCH MARKS, SEE CORPS OF ENGINEERS DESCRIPTION BOOK ENTITLED "REVERE BEACH MASS".

3. COORDINATES ARE BASED ON THE LAMBERT GRID SYSTEM OF COMMONWEALTH OF MASSACHUSETTS. (NAD 1927)

LEGEND

NEW WORK	EXISTING
BEACH FILL SLOPE	MARSH
LIMITS OF TEMPORARY EASEMENT	MEAN LOW WATER LINE
	CONTOUR LINE
	SPOT ELEVATION
	RIP RAP
	FENCE
	PAVED ROADWAY
BEACH WORK LIMITS — CONTRACTOR'S WORK LIMITS EXTEND FROM THE MDC SEAWALL (SEAWARD SIDE) TO 500' SEAWARD.	GRAVEL ROADWAY
⚠ BEACH CAPPING LIMIT (100' SEAWARD OF MDC SEAWALL)	TRAIL
	TELEPHONE POLE
⚠ BEACH SAND BORROW AREA	RETAINING WALL
	TREE LINE
	GUARD RAIL
⚠ TEMPORARY DRAINAGE PIPE EXTENSIONS	MDC SEAWALL

VALUE ENGINEERING PAYS DIVIDENDS

SAFETY PAYS

GRAPHIC SCALE
1"=100' 100' 0 100' 200'

As Built Drawing
Contract No. DACW 33900-0098

REVISION	DATE	DESCRIPTION	BY
	7-27-92	FINAL FIELD CORRECTION.	
⚠	6-15-92	TEMPORARY DRAINAGE PIPE EXTENSIONS.	
⚠	4-(-91	ADD BEACH CAPPING LIMITS.	

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

DES. BY A.M.L. | DR. BY R.J.S. | CH. BY R.M.

SUBMITTED: PROJECT MANAGER

RECOMMENDED: CHIEF, LOCAL PROTECTION

APPROVED: CHIEF, DESIGN BRANCH

REVERE BEACH, MASSACHUSETTS
BEACH EROSION CONTROL PROJECT
SANDFILL PLAN
ELIOT CIRCLE TO STA. 34+00

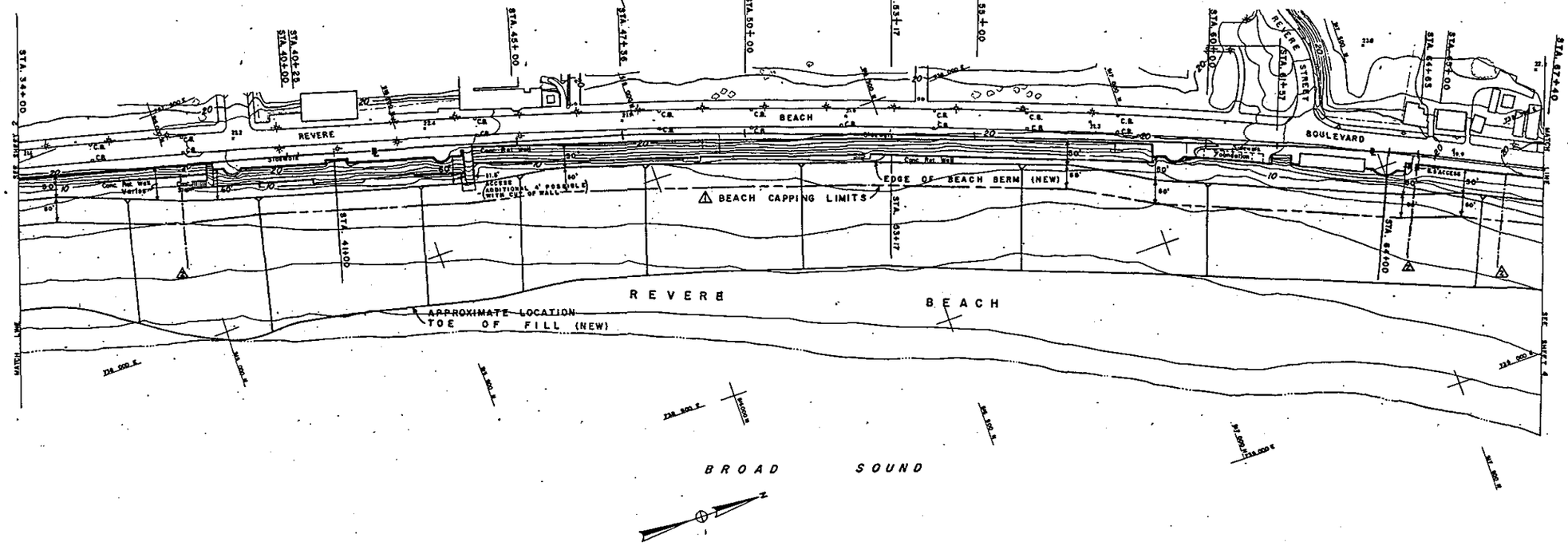
APPROVED: DIRECTOR OF ENGINEERING — DATE JULY 1990

SCALE 1"=100' | SPEC. NO. DACW 33-90-B-0094

DRAWING NUMBER
B.E. MASS.-63

SHEET 2 OF 16

CORPS OF ENGINEERS — U. S. ARMY



NOTE:
. *For General Notes see sheet 1 of 16.*
For Legend see sheet 2 of 16.

VALUE ENGINEERING PAYS DIVIDENDS

SAFETY PAYS

GRAPHIC SCALE
1" = 100' 100 0 100 200

As Built Drawing
Contract No. DACW 33-90-C-0098

REVISION	DATE	DESCRIPTION	BY
2	8-15-92	TEMPORARY DRAINAGE PIPE EXTENSIONS.	RJS
1	4-1-91	BEACH CAPPING LIMITS.	RJS

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

DES. BY A.M.L. | DR. BY R/S | CK. BY R.M.

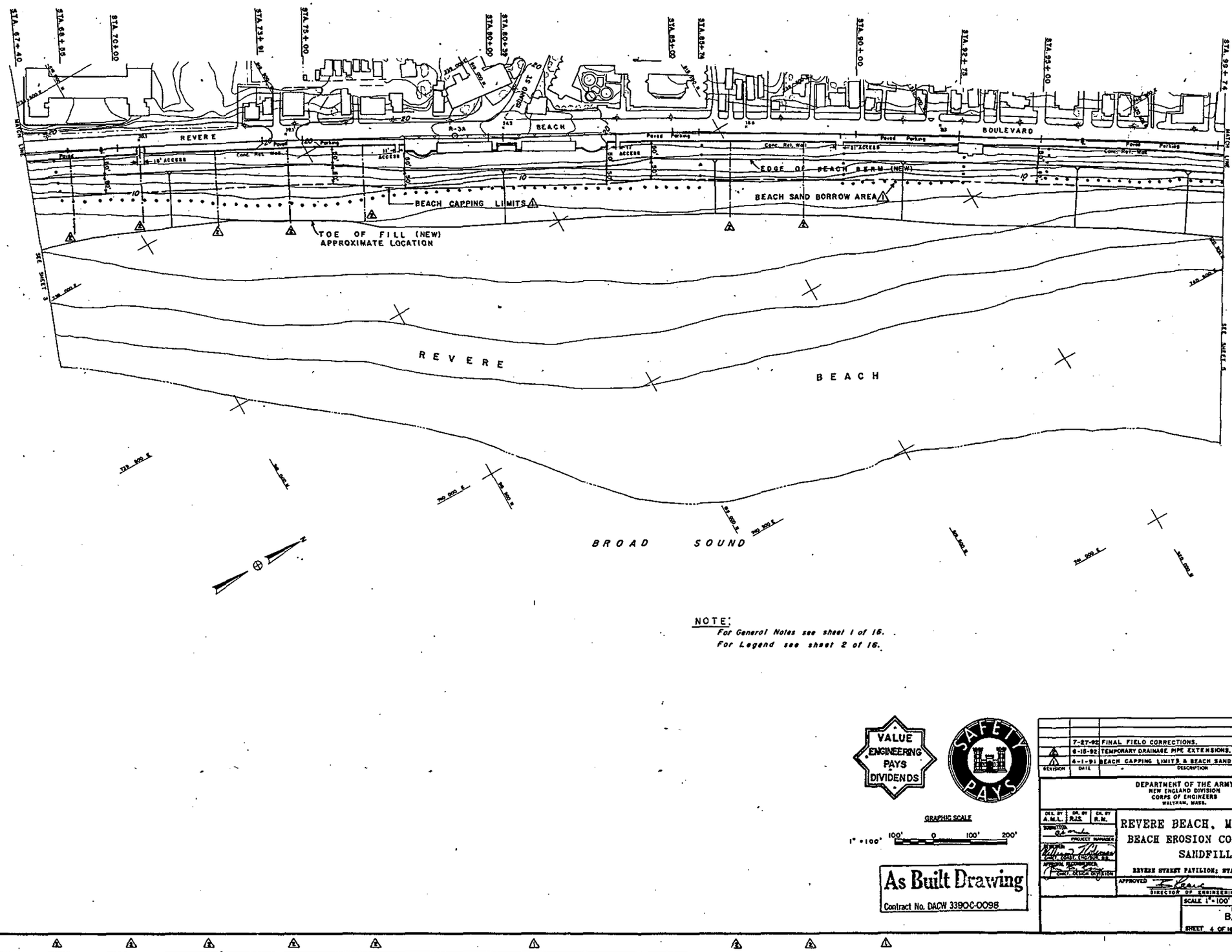
SUBMITTED
PROJECT MANAGER
CHIEF, COAST. ENGINEER. BR.
CHIEF, DESIGN BRANCH

REVERE BEACH, MASSACHUSETTS
BEACH EROSION CONTROL PROJECT
SANDFILL PLAN
STA. 34+00 TO REVERE STREET PAVILION; STA. 67+40

APPROVED
DIRECTOR OF ENGINEERING
DATE JULY 1990

SCALE 1"=100' | SPEC. NO. DACW 33-90-B-0094
DRAWING NUMBER B.E. MASS.-63
SHEET 3 OF 16

CORPS OF ENGINEERS — U. S. ARMY



NOTE:
For General Notes see sheet 1 of 16.
For Legend see sheet 2 of 16.

VALUE ENGINEERING PAYS DIVIDENDS

SAFETY PAYS

GRAPHIC SCALE
1" = 100' 100' 0 100' 200'

As Built Drawing
Contract No. DACW 33900-0098

REVISION	DATE	DESCRIPTION	BY
	7-27-92	FINAL FIELD CORRECTIONS.	
2	6-15-92	TEMPORARY DRAINAGE PIPE EXTENSIONS.	AC
1	6-1-91	BEACH CAPPING LIMITS & BEACH SAND BORROW AREA.	AC

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

DES. BY A.M.L. | DR. BY R.J.S. | CK. BY R.M.

SUBMITTED: PROJECT MANAGER

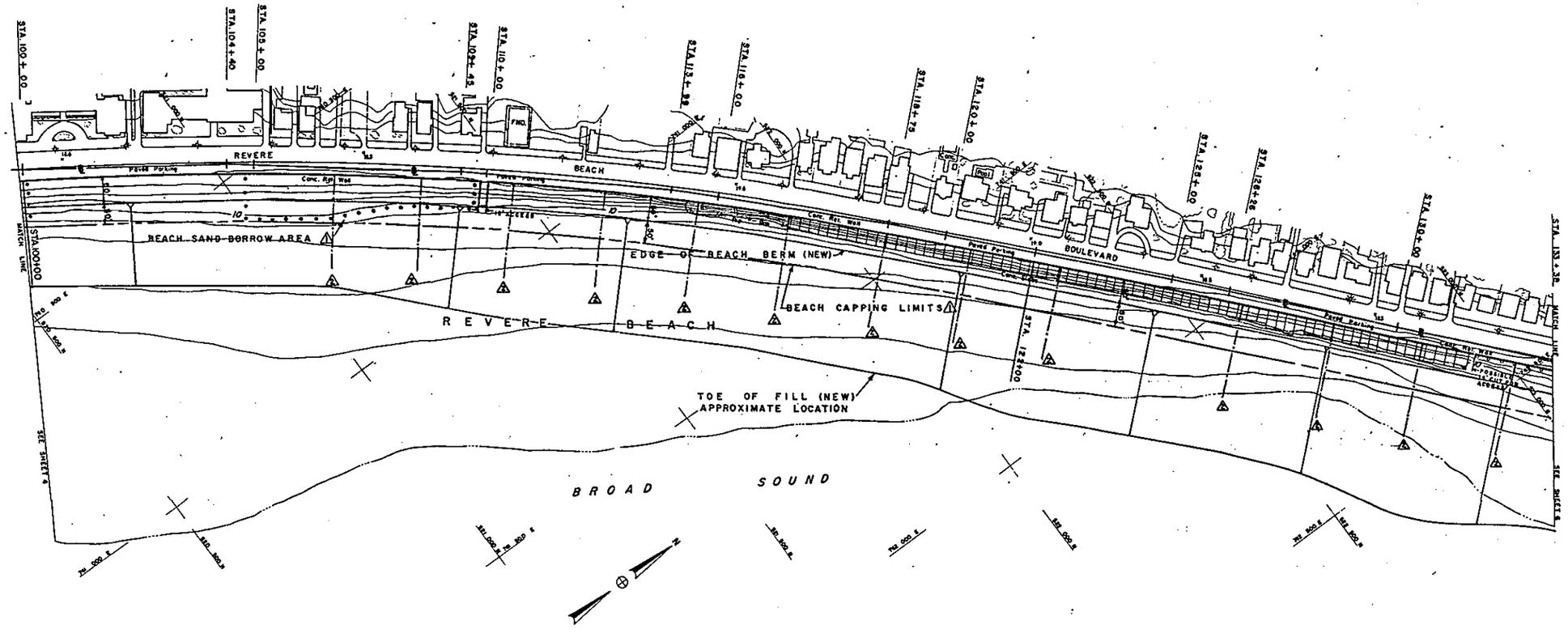
APPROVED: CHIEF, DESIGN BRANCH

REVERE BEACH, MASSACHUSETTS
BEACH EROSION CONTROL PROJECT
SANDFILL PLAN
REVERE STREET PAVILION; STA. 67+40 TO STA. 99+74

APPROVED: DIRECTOR OF ENGINEERING — DATE JULY 1990

SCALE 1" = 100' | SPEC. NO. DACW 33-90-B-0094
DRAWING NUMBER B.E. MASS.-63
SHEET 4 OF 16

CORPS OF ENGINEERS — U. S. ARMY



NOTE:

For General Notes See Sheet 1 of 16.
For Legend see sheet 2 of 16.

VALUE ENGINEERING PAYS DIVIDENDS

SAFETY PAYS

GRAPHIC SCALE
100' 0 100' 200'
1" = 100 FT.

As Built Drawing
Contract No. DACW 33900-0098

REVISION	DATE	DESCRIPTION	BY
	7-27-92	FINAL FIELD CORRECTIONS.	
2	6-16-92	TEMPORARY DRAINAGE PIPE EXTENSIONS.	RA
1	4-1-91	BEACH CAPPING LIMITS & BEACH SAND BORROW AREA.	AA

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

DES. BY A.M.L. | DR. BY R.J.S. | CK. BY R.M.

SUBMITTED: PROJECT MANAGER

APPROVED: CHIEF, DESIGN BRANCH

APPROVED: CHIEF, ENGINEERING DIVISION

REVERE BEACH, MASSACHUSETTS
BEACH EROSION CONTROL PROJECT
SANDFILL PLAN
STA. 100+00 TO STA. 133+38

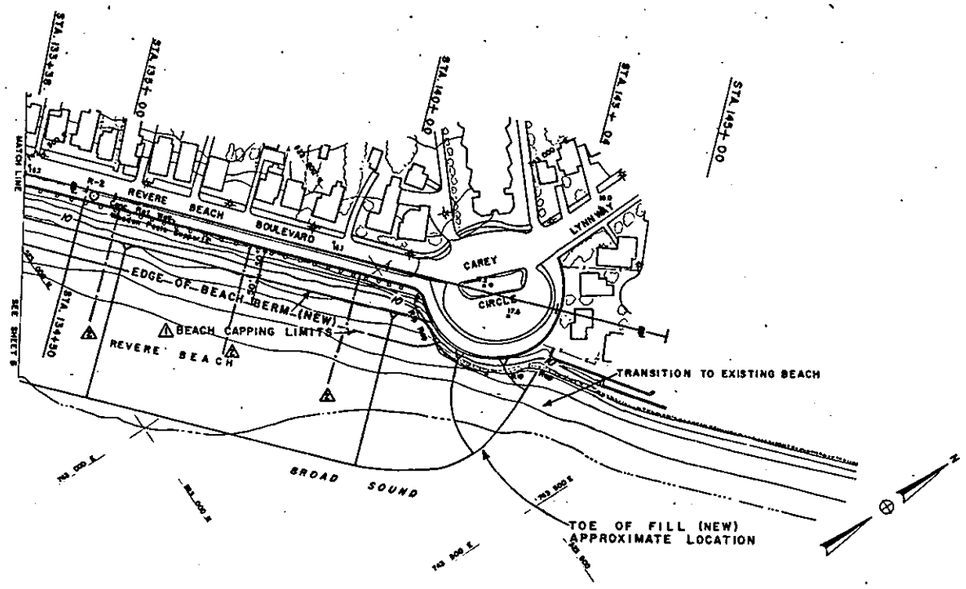
APPROVED: DIRECTOR OF ENGINEERING — DATE JULY 1990

SCALE 1"=100' | SPEC. NO. DACW 33-90-B-0094

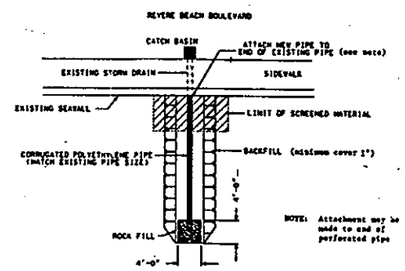
DRAWING NUMBER
B.E. MASS.-63

SHEET 5 OF 16

CORPS OF ENGINEERS — U. S. ARMY

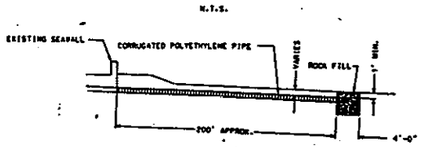


REVERE BEACH BOULEVARD STORM DRAINAGE PIPE EXTENSION TEMPORARY SOLUTION



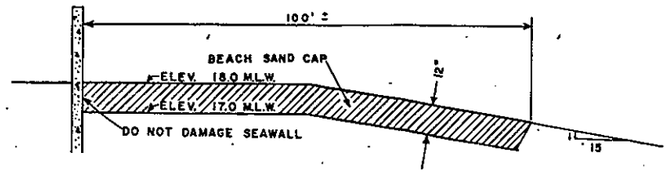
PLAN VIEW

N.T.S.



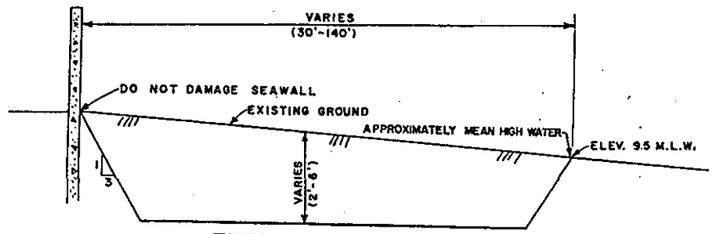
SECTIONAL VIEW

N.T.S.



AREA TO BE FILLED

N.T.S.



TYPICAL SECTION

BEACH SAND BORROW AREA

STATIONS 68+00 TO 114+00

N.T.S.

NOTE:

For General Notes see sheet 1 of 16.

For Legend see sheet 2 of 16.

VALUE ENGINEERING PAYS DIVIDENDS

SAFETY PAYS

GRAPHIC SCALE

1" = 100' 100' 0 100' 200'

As Built Drawing

Contract No. DACW 33900-0098

REVISION	DATE	DESCRIPTION	AREA	BY
2	6-18-92	TEMPORARY DRAINAGE PIPE EXTENSIONS.	66	
1	4-1-91	BEACH CAPPING LIMITS/SECTIONS FOR BEACH FILL & BORROW	66	

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

DES. BY A.M.L. | DR. BY R.J.S. | CK. BY R.M.

SUBMITTED: PROJECT MANAGER

RECOMMENDED: CHIEF, COAST. ENGINEERING BR.

APPROVED: CHIEF, DESIGN BRANCH

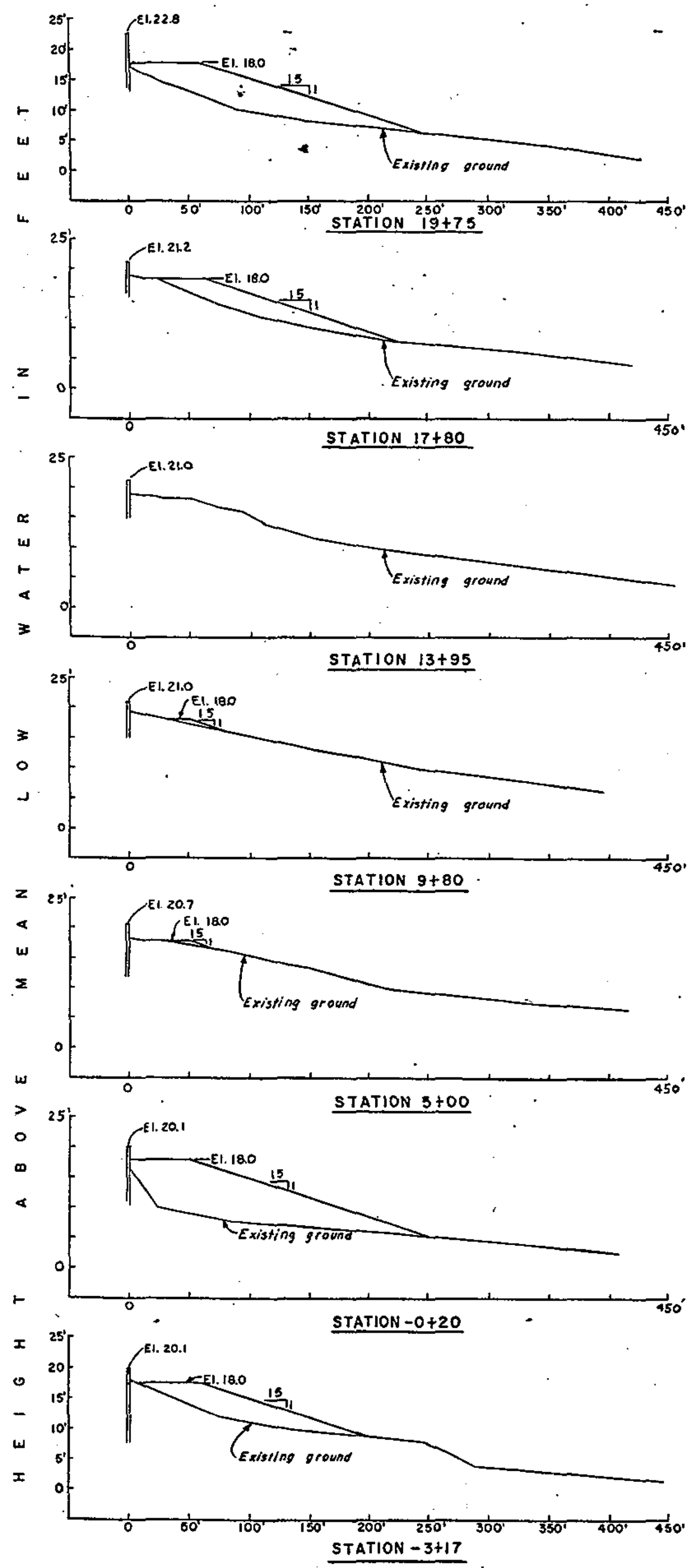
REVERE BEACH, MASSACHUSETTS BEACH EROSION CONTROL PROJECT SANDFILL PLAN STA. 133+38 TO CAREY CIRCLE

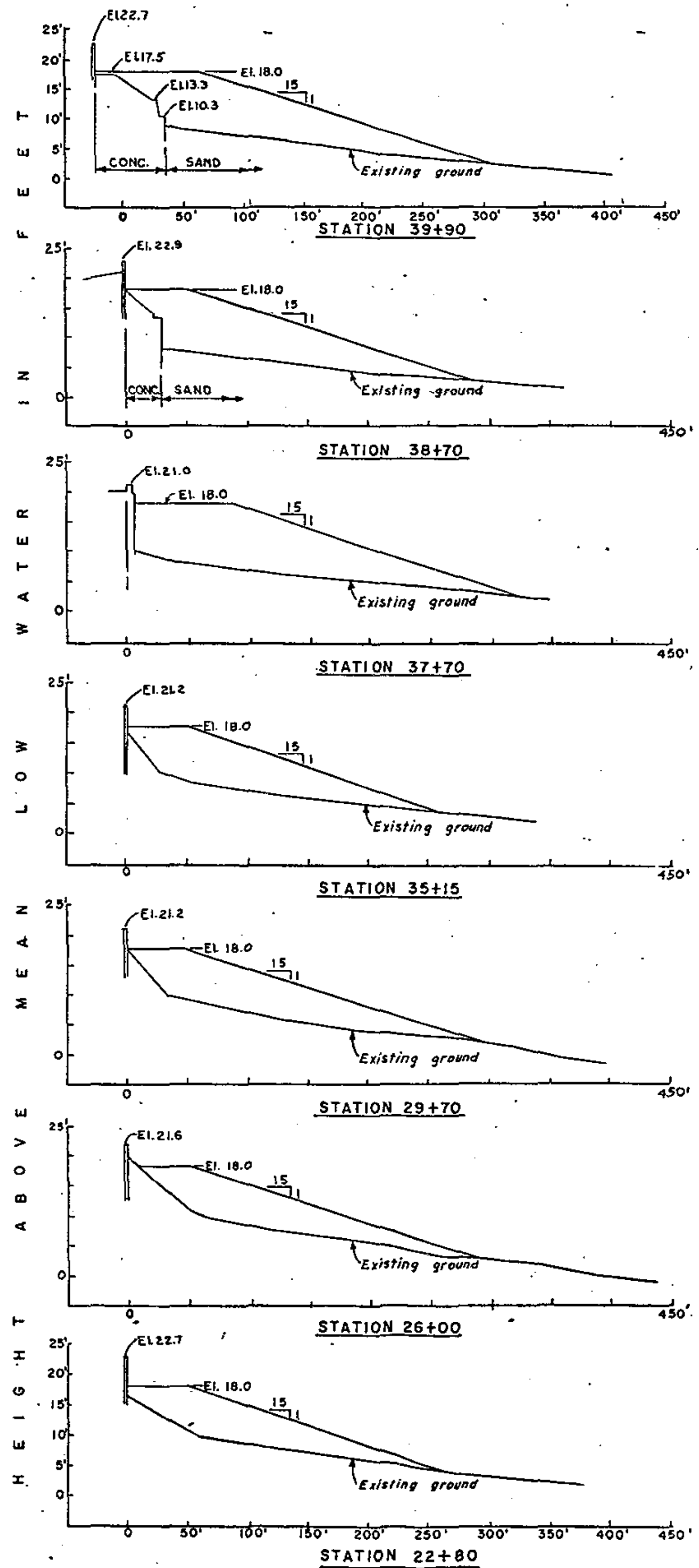
APPROVED: DIRECTOR OF ENGINEERING — DATE JULY 1990

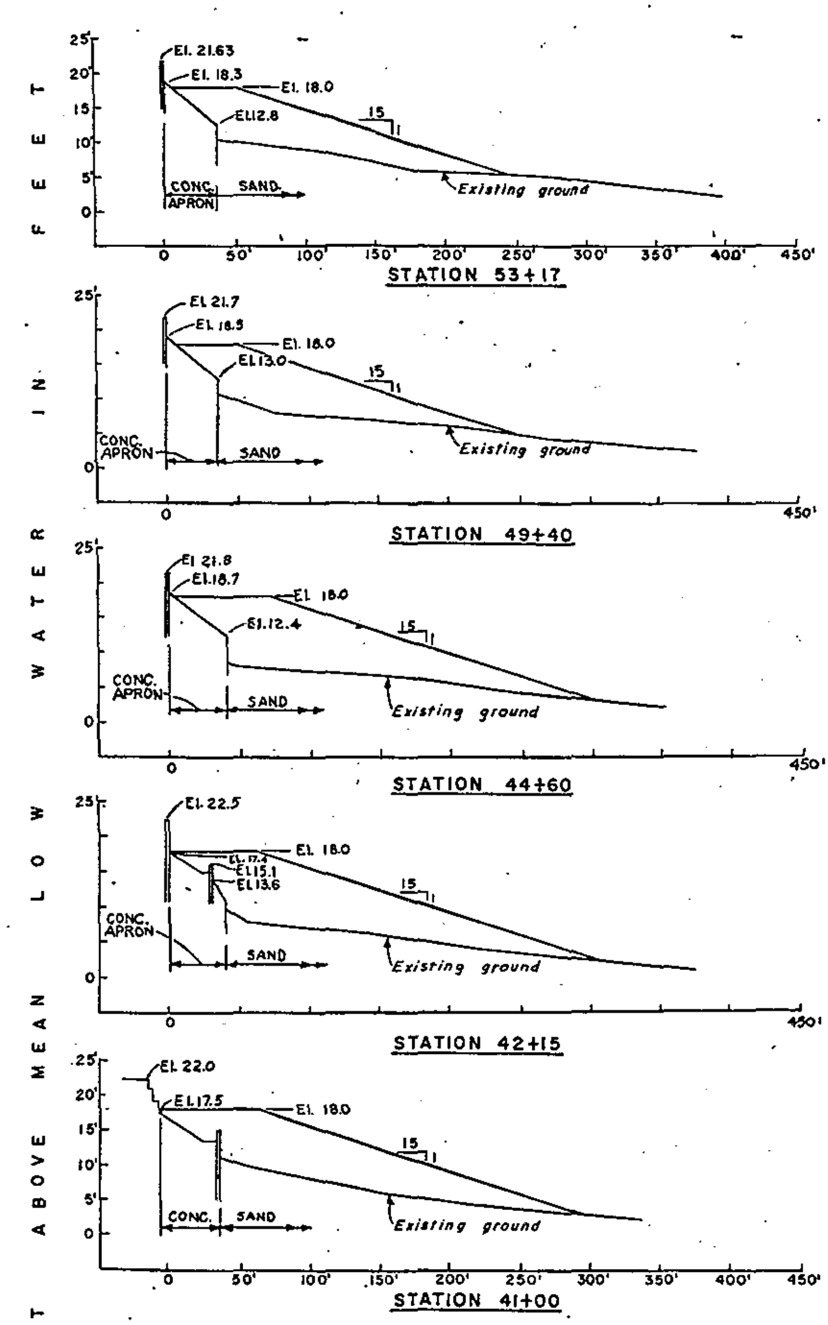
SCALE 1"=100' | SPEC. NO. DACW 33-90-B-0094

DRAWING NUMBER B.E. MASS.-63

SHEET 6 OF 16







NOTE:
For General Notes see sheet 1 of 16.
For Legend see sheet 2 of 16.

VALUE ENGINEERING PAYS DIVIDENDS

SAFETY PAYS

GRAPHIC SCALES
VERT. 1"=10' 10' 0 10' 20'
HOR. 1"=50' 50' 0 50' 100'

As Built Drawing
Contract No. DACW 3390C-0098

REVISION	DATE	DESCRIPTION	BY

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

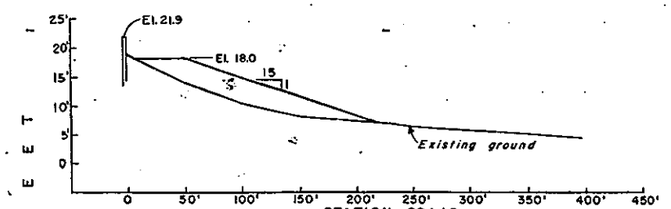
DES. BY A.M.L. | DR. BY R.J.S. | CK. BY R.M.
SUBMITTED: PROJECT MANAGER
REVIEWED: CHIEF, CONST. ENG./SUR. BR.
APPROVAL RECOMMENDED: CHIEF, DESIGN DIVISION

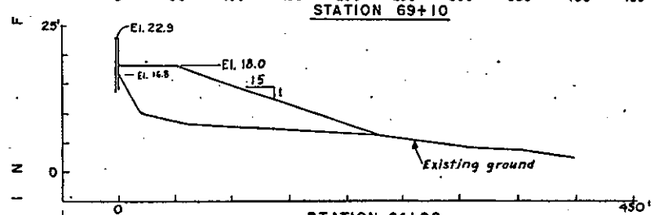
REVERE BEACH, MASSACHUSETTS
BEACH EROSION CONTROL PROJECT
SANDFILL PROFILES
STA. -3+17 TO STA. 53+17

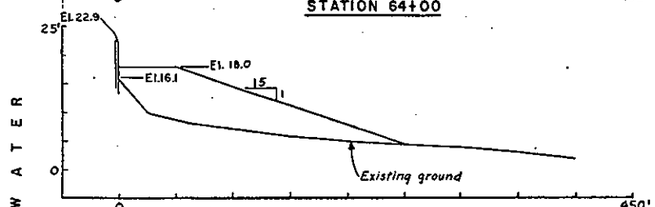
APPROVED: DIRECTOR OF ENGINEERING   DATE JULY 1990

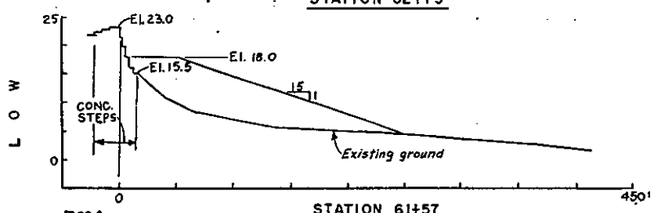
SCALE: AS SHOWN | SPEC. NO. DACW 33-90-B-0094
DRAWING NUMBER B.E. MASS.-63
SHEET 7 OF 16

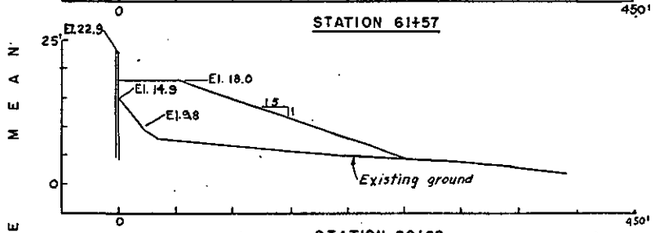
CORPS OF ENGINEERS

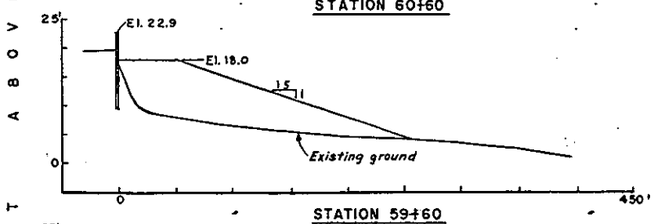


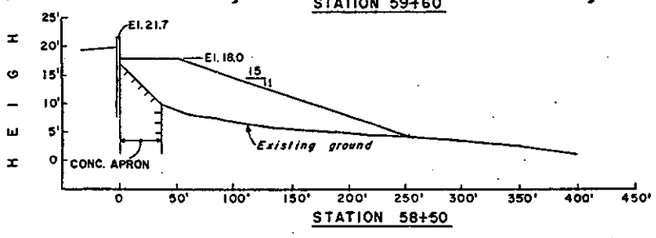


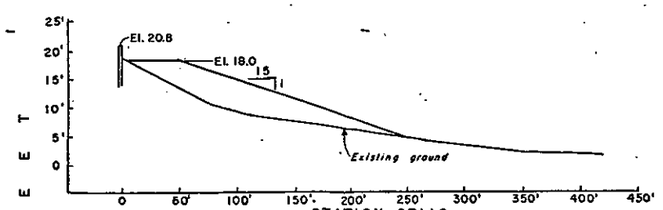


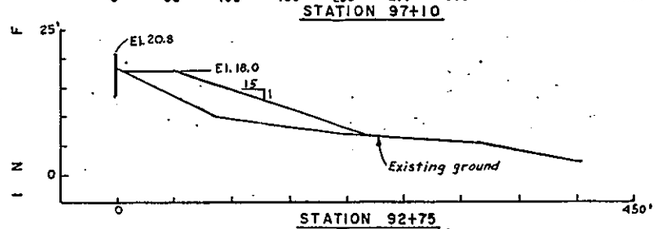


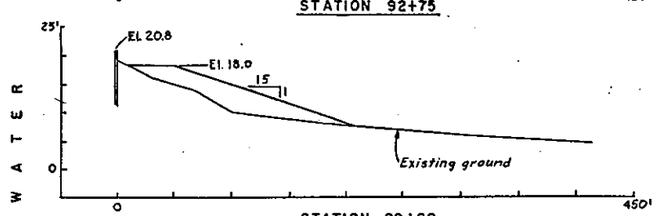


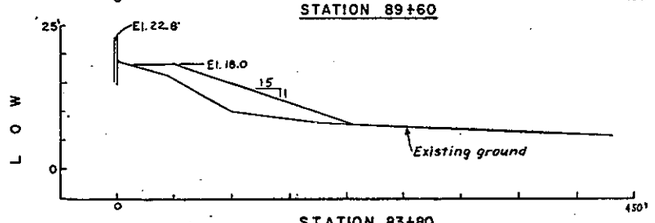


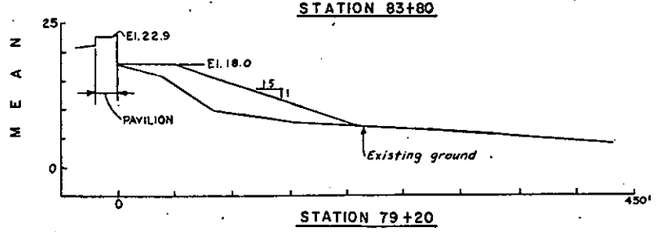


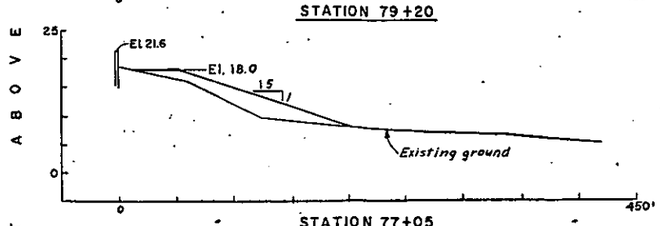


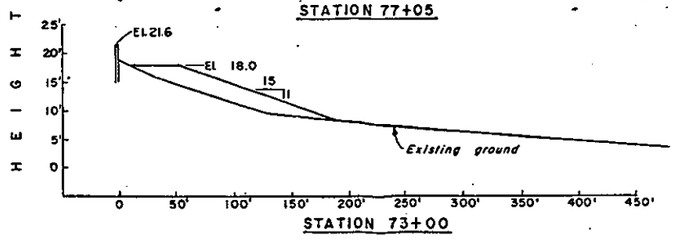


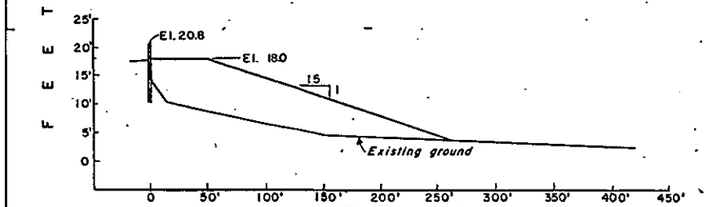


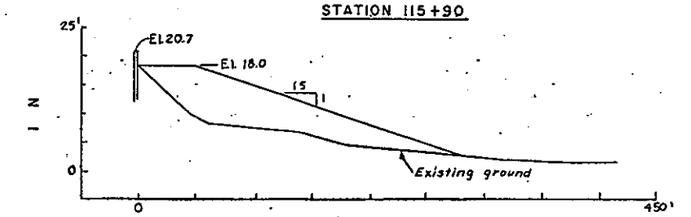


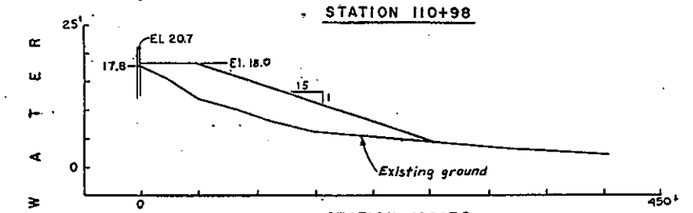


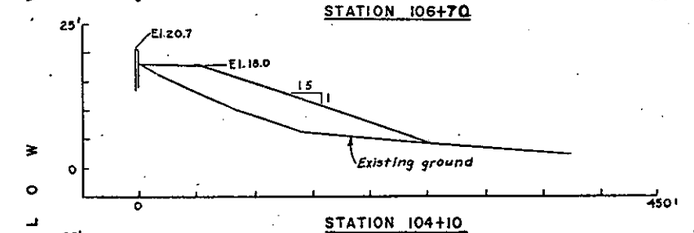


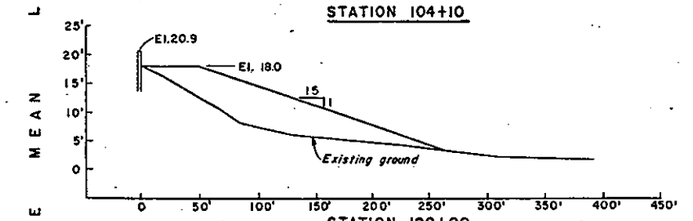












HEIGHT ABOVE MEAN LOW WATER IN FEET

U. S. ARMY

NOTE:
For General Notes see sheet 1 of 16.
For Legend see sheet 2 of 16.

VALUE ENGINEERING PAYS DIVIDENDS

SAFETY PAYS

GRAPHIC SCALES
VERT. 1"=10'
HOR. 1"=50'

As Built Drawing
Contract No. DACW 33-90-C-0098

REVISION	DATE	DESCRIPTION	BY

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

DES. BY A.M.L. | DR. BY R.J.S. | CK. BY R.M.

SUBMITTED
PROJECT MANAGER

REVIEWED
CHIEF, ENGINEERING DIVISION

APPROVED RECOMMENDED
CHIEF, DESIGN BRANCH

REVERE BEACH, MASSACHUSETTS
BEACH EROSION CONTROL PROJECT
SANDFILL PROFILES
STA. 58+50 TO STA. 115+90

APPROVED
DIRECTOR OF ENGINEERING
DATE JULY 1990

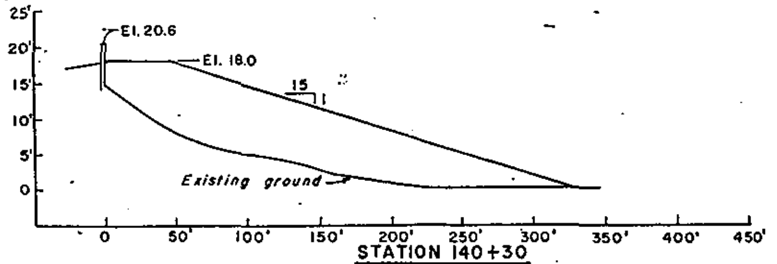
SCALE AS SHOWN | SPEC. NO. DACW 33-90-B-0094

DRAWING NUMBER
B.E. MASS.-63

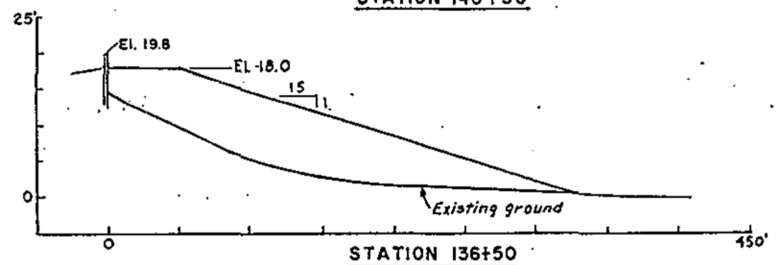
SHEET 8 OF 16

CORPS OF ENGINEERS — U. S. ARMY

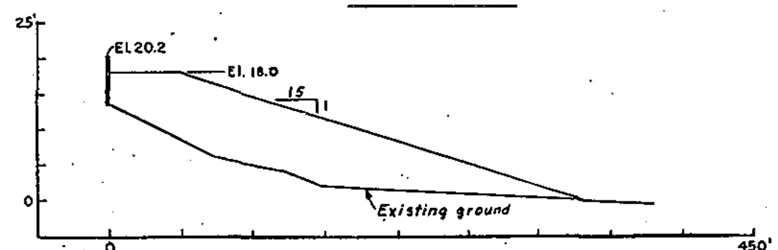
HEIGHT ABOVE MEAN LOW WATER IN FEET



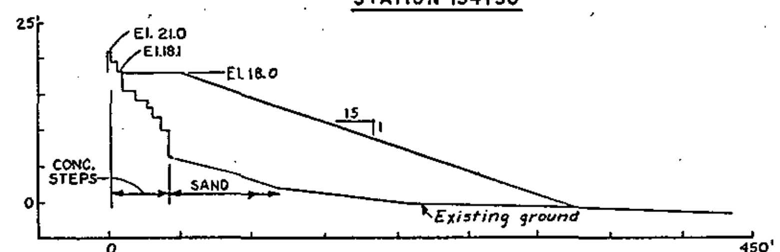
STATION 140+30



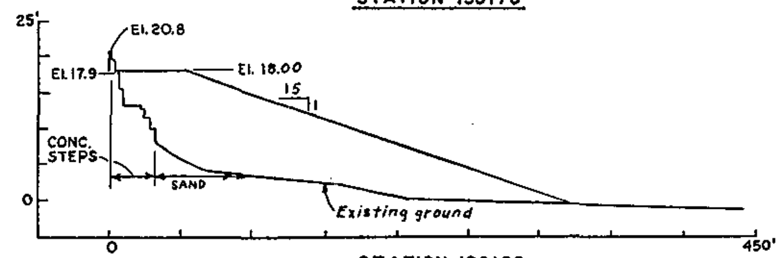
STATION 136+50



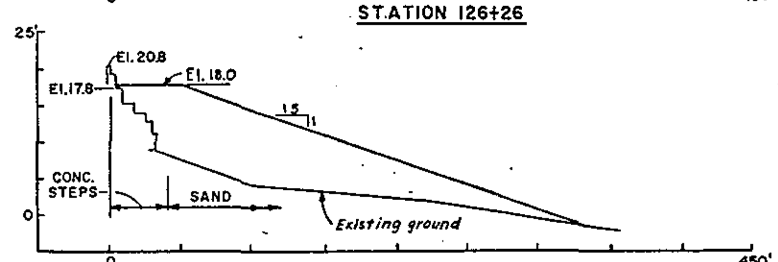
STATION 134+50



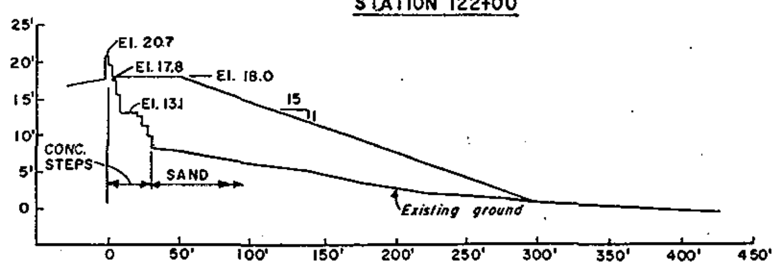
STATION 130+70



STATION 126+26



STATION 122+00



STATION 119+10

NOTE:

For General Notes see sheet 1 of 16.
For Legend see sheet 2 of 16.

GRAPHIC SCALES

VERT. 1" = 10' — 10' 0 10' 20'

HOR. 1" = 50' — 50' 0 50' 100'

As Built Drawing

Contract No. DACW 3390C-0098

REVISION	DATE	DESCRIPTION	BY

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

DES. BY A.M.L. | DR. BY R.J.S. | CK. BY R.M.

SUBMITTED: PROJECT MANAGER

REVIEWED: CHIEF, COAST. ENG/SUR. BR.

APPROVAL RECOMMENDED: CHIEF, DESIGN DIVISION

REVERE BEACH, MASSACHUSETTS
BEACH EROSION CONTROL PROJECT
SANDFILL PROFILES
STA. 119+10 TO STA. 145+00

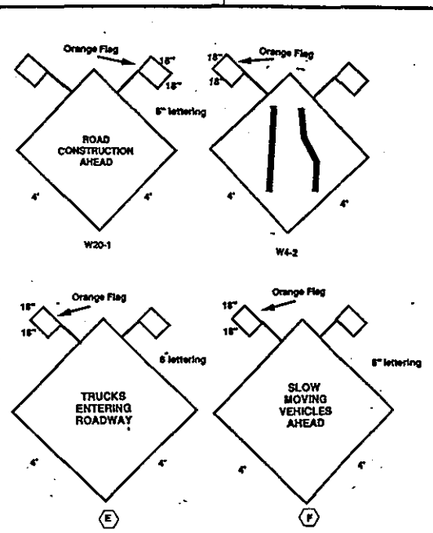
APPROVED: DIRECTOR OF ENGINEERING — DATE JULY 1990

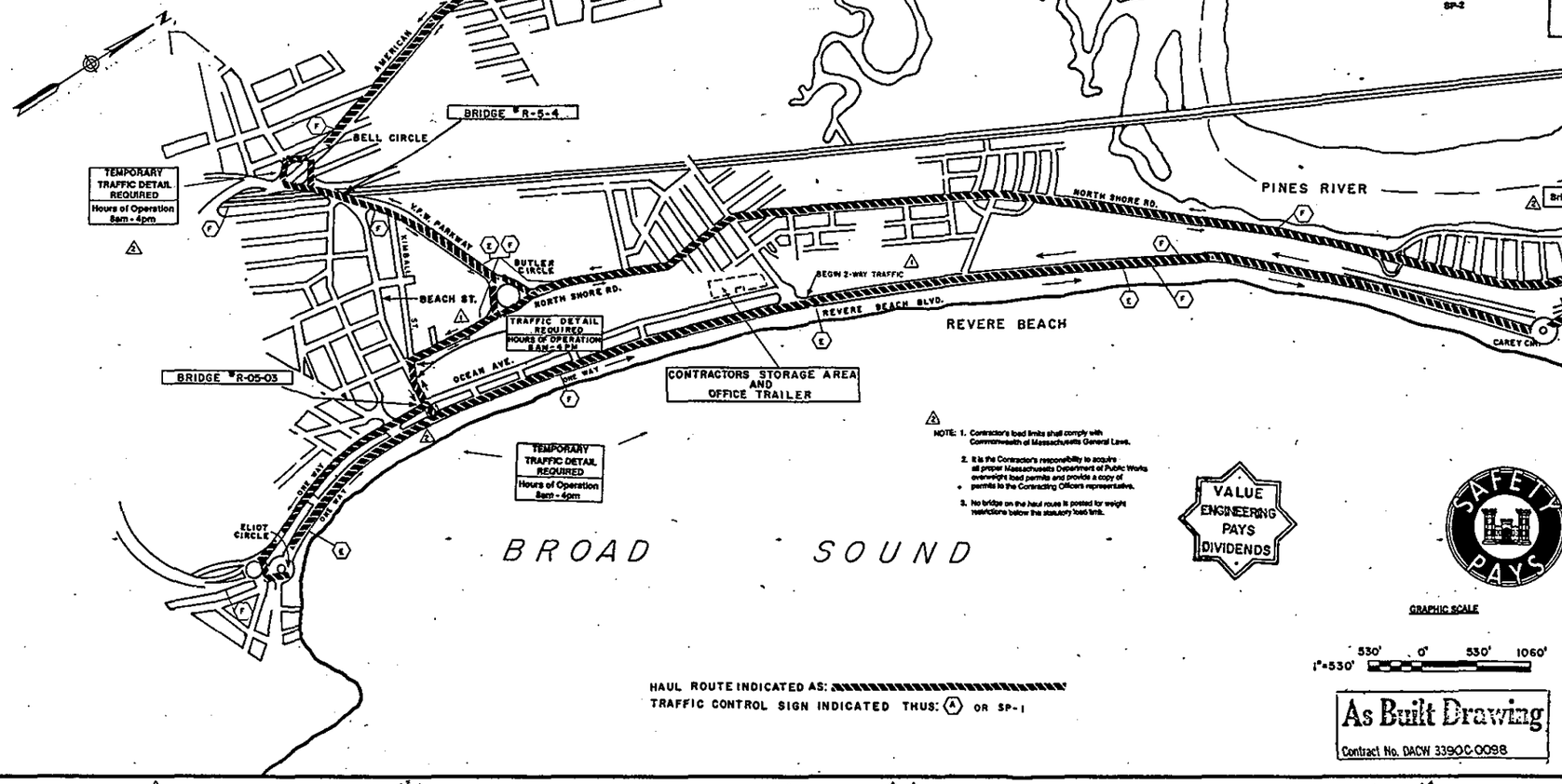
SCALE: AS SHOWN — SPEC. NO. DACW 33-90-B-0094

DRAWING NUMBER B.E. MASS.-63

SHEET 9 OF 16

CORPS OF ENGINEERS — U. S. ARMY





NOTE: 1. Contractor's load limits shall comply with Commonwealth of Massachusetts General Laws.

2. It is the Contractor's responsibility to acquire all proper Massachusetts Department of Public Works overweight load permits and provide a copy of permits to the Contracting Officer's representative.

3. No bridge on the haul route is posted for weight restrictions below the statutory load limit.

VALUE ENGINEERING PAYS DIVIDENDS

SAFETY PAYS

GRAPHIC SCALE

530' 0' 530' 1060'

1"=530'

HAUL ROUTE INDICATED AS: ▬▬▬▬▬

TRAFFIC CONTROL SIGN INDICATED THUS: (A) OR SP-1

As Built Drawing

Contract No. DACW 33900-0098

REVISION	DATE	DESCRIPTION	BY
A	18 AUG 90	TRAFFIC MANAGEMENT PLAN REVISED (ADD. # 3)	AE
A	31 JUL 90	CHANGED NOTATION (ADD. # 1)	AE

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

DES. BY V.J.G. | DR. BY V.J.G. | CH. BY R.M.

SUBMITTED: PROJECT MANAGER

REVIEWED: CHIEF, COAST. ENG. BR.

APPROVAL RECOMMENDED: CHIEF, DESIGN BRANCH

APPROVED: DIRECTOR OF ENGINEERING — DATE JULY 1990

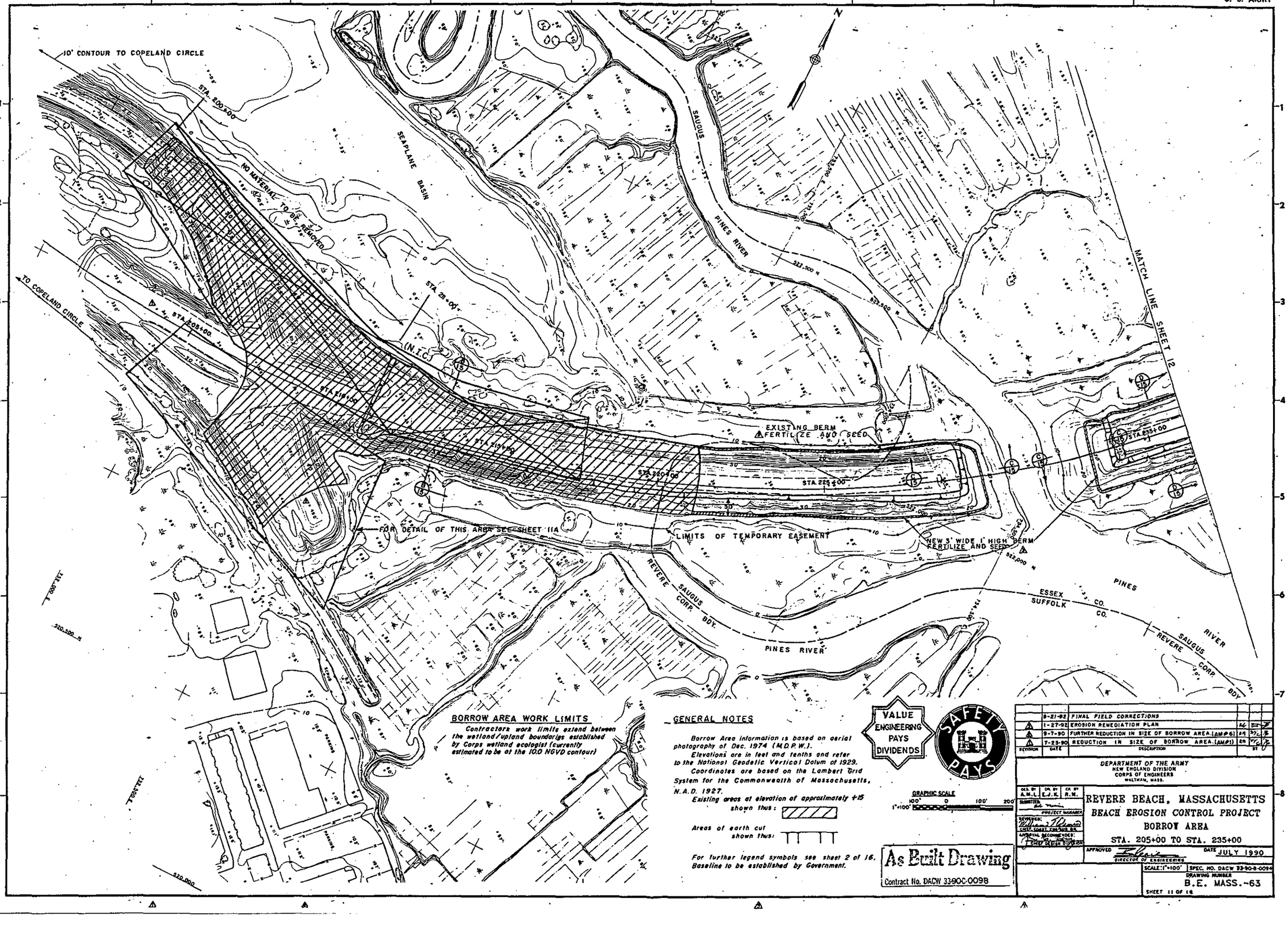
REVERE BEACH, MASSACHUSETTS
BEACH EROSION CONTROL PROJECT
HAUL ROUTE

SCALE AS SHOWN | SPEC. NO. DACW 33-90-B-0094

DRAWING NUMBER
B.E. MASS.-63

SHEET 10 OF 16

CORPS OF ENGINEERS — U. S. ARMY



BORROW AREA WORK LIMITS

Contractors work limits extend between the wetland/upland boundaries established by Corps wetland ecologist (currently estimated to be at the 10.0 NGVD contour)

GENERAL NOTES

Borrow Area information is based on aerial photography of Dec. 1974 (M.D.P.W.).

Elevations are in feet and tenths and refer to the National Geodetic Vertical Datum of 1929.

Coordinates are based on the Lambert Grid System for the Commonwealth of Massachusetts, N.A.D. 1927.

Existing areas at elevation of approximately +15 shown thus:

Areas of earth cut shown thus:

For further legend symbols see sheet 2 of 16.

Baseline to be established by Government.

VALUE ENGINEERING PAYS DIVIDENDS

SAFETY PAYS

GRAPHIC SCALE
100' 0 100' 200'
1"=100'

As Built Drawing
Contract No. DACW 33-90-C-0098

REVISION	DATE	DESCRIPTION	BY
	8-21-92	FINAL FIELD CORRECTIONS	
A	1-27-92	EROSION REMEDIATION PLAN	RC
A	9-7-90	FURTHER REDUCTION IN SIZE OF BORROW AREA.(AMP6)	RN
A	7-25-90	REDUCTION IN SIZE OF BORROW AREA.(AMP1)	RN

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

DES. BY A.M.L. | DR. BY E.J.K. | CK. BY R.N.

SUBMITTED: PROJECT MANAGER

RECOMMENDED: CHIEF, COAST. ENG. BR.

APPROVAL RECOMMENDED: CHIEF, DESIGN DIVISION

APPROVED: DIRECTOR OF ENGINEERING

REVERE BEACH, MASSACHUSETTS
BEACH EROSION CONTROL PROJECT
BORROW AREA
STA. 205+00 TO STA. 235+00

DATE JULY 1990

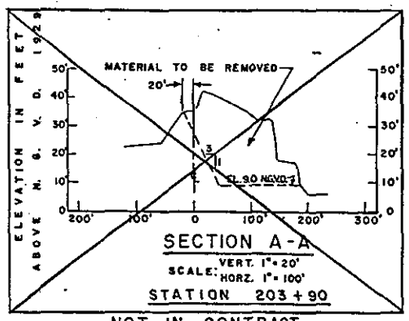
SCALE: 1"=100' | SPEC. NO. DACW 33-90-B-0094

DRAWING NUMBER B.E. MASS.-63

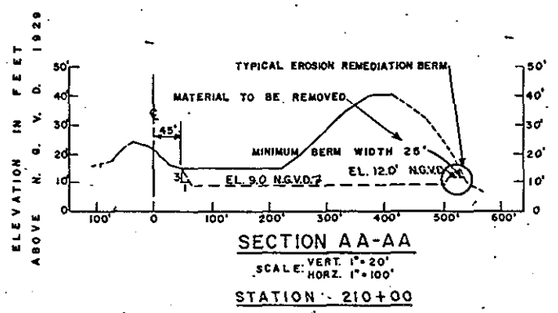
SHEET 11 OF 16

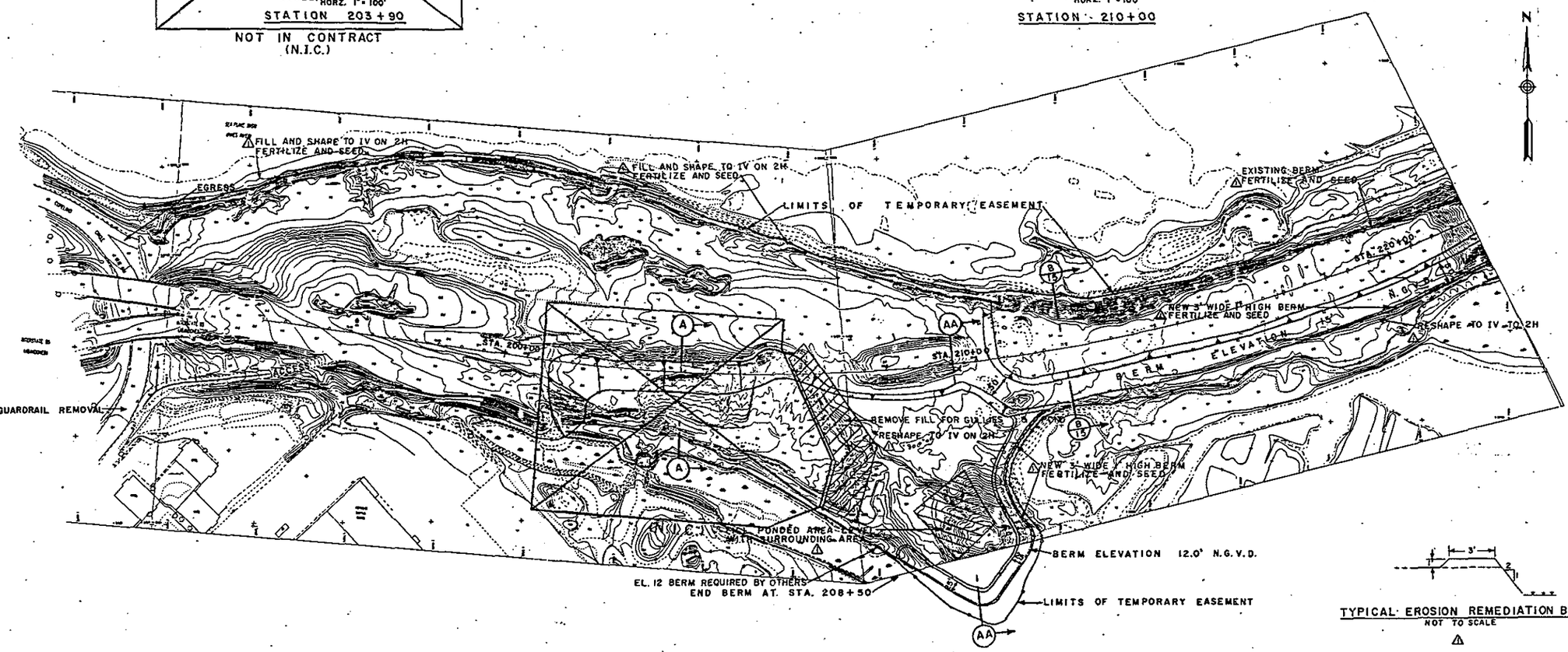
CORPS OF ENGINEERS

U. S. ARMY

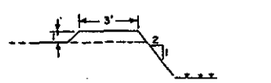


NOT IN CONTRACT
(N.I.C.)





PLAN
SCALE: 1"=100'



TYPICAL EROSION REMEDIATION BERM
NOT TO SCALE

NOTES:

For legend symbols see sheet 2 of 16 of contract plans.
Topography compiled and controlled by James W. Sewall company, Old Town, Maine by photogrammetric methods from aerial photographs dated 10-27-90.

SAFETY PAYS

GRAPHIC SCALES
1"=20' 20' 0 20' 40'
1"=100' 100' 0 100' 200'

As Built Drawing
Contract No. DACW 33-90-C-0098

REVISION	DATE	DESCRIPTION	BY
2	7-27-92	FINAL FIELD CORRECTION.	
1	1-27-92	EROSION REMEDIATION PLAN.	

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

DES. BY R.M. | DR. BY E.J.K. | CK. BY

SUBMITTED _____ PROJECT MANAGER

REVIEWED _____ CHIEF, COASTAL BRANCH

APPROVED _____ CHIEF, ENGR. DIVISION

APPROVED _____ DIRECTOR OF ENGINEERING

REVERE BEACH, MASSACHUSETTS
BEACH EROSION CONTROL PROJECT
BORROW AREA
STA. 201+00 TO STA. 211+00

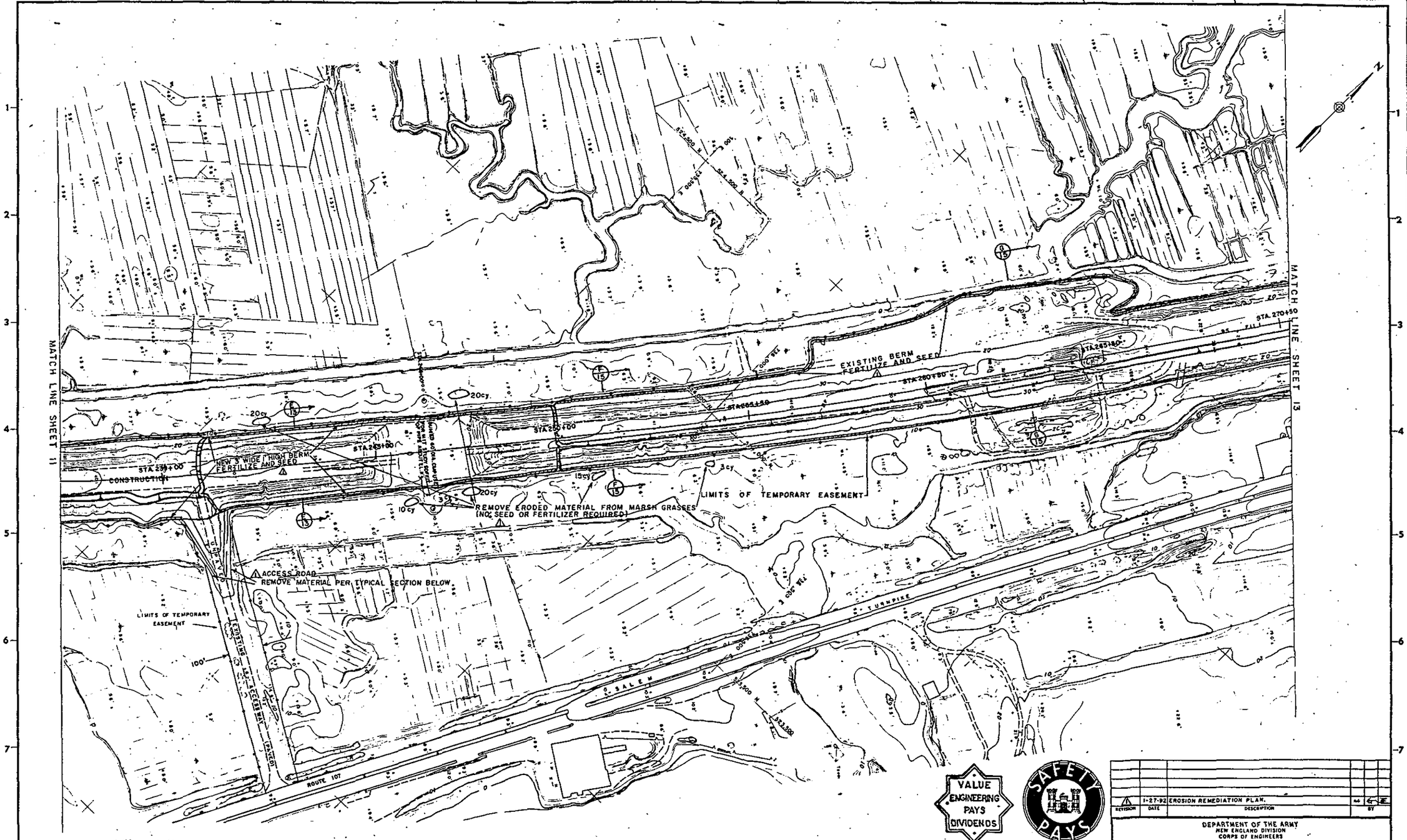
DATE MARCH 1991

SCALE AS SHOWN | SPEC. NO. DACW 33-90-B-0094

DRAWING NUMBER
B.E. MASS.-63

SHEET 1 OF 16

CORPS OF ENGINEERS — U. S. ARMY



NOTE:
For Borrow Area General Notes see sheet 11 of 16.

GRAPHIC SCALE
1"=100' 100' 0 100' 200'

VALUE ENGINEERING PAYS DIVIDENDS

SAFETY PAYS

As Built Drawing
Contract No. DACW 33900-0098

REVISION	DATE	DESCRIPTION	BY
1	1-27-92	EROSION REMEDIATION PLAN.	AA

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

DES. BY A. M. L. | DR. BY R.J.S. | CK. BY R.M.

SUBMITTED: PROJECT MANAGER

RECOMMENDED: CHIEF, DESIGN BRANCH

APPROVED: CHIEF, DESIGN SECTION

REVERE BEACH, MASSACHUSETTS
BEACH EROSION CONTROL PROJECT
BORROW AREA
STA. 235+00 TO STA. 270+50

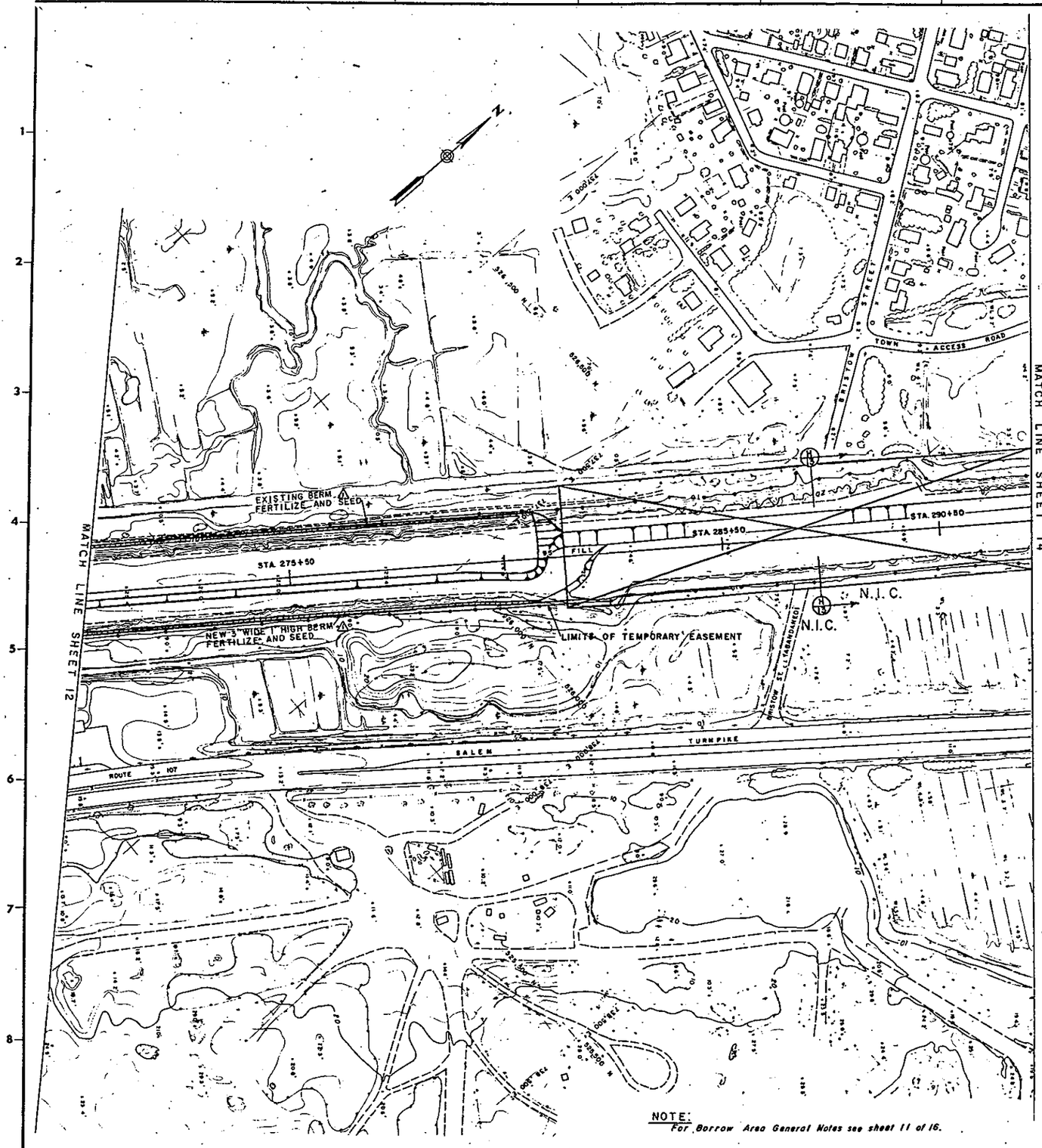
APPROVED: DIRECTOR OF ENGINEERING — DATE JULY 1990

SCALE: 1"=100' | SPEC. NO. DACW 33-90-B-0094

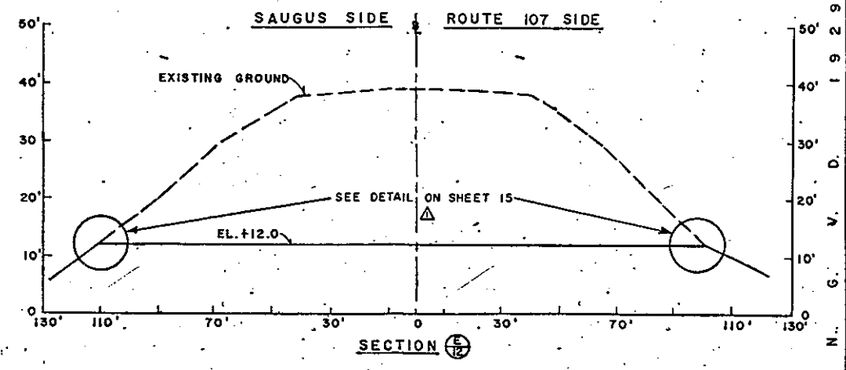
DRAWING NUMBER
B.E. MASS.-63

SHEET 12 OF 16

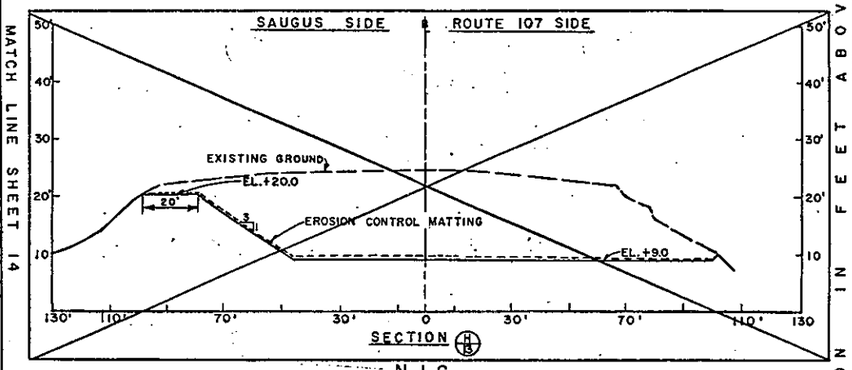
CORPS OF ENGINEERS — U. S. ARMY



NOTE:
For Borrow Area General Notes see sheet 11 of 16.



SECTION E/12



SECTION E/13

N.I.C.

NOTE:
SEE NOTES ON SHEET 15.

ELEVATION IN FEET ABOVE N. G. V. D. 1929

VALUE ENGINEERING PAYS DIVIDENDS

SAFETY PAYS

GRAPHIC SCALE
1"=100' 100' 0 100' 200'
1"=10'H. 10 0 10 20
1"=20'V. 20 0 20 40

As Built Drawing
CONTRACT NO. DACW33-90-C-0098

REVISION	DATE	DESCRIPTION	BY
	7-27-92	FINAL FIELD CORRECTION.	
	1-27-92	EROSION REMEDIATION PLAN.	

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS

DES. BY R.J.S.	DR. BY R.J.S.	CK. BY R.M.
SUBMITTED: PROJECT ENGINEER		
APPROVED: CHIEF, ENGINEERING DIVISION		
APPROVED: CHIEF, OPERATIONS DIVISION		

REVERE BEACH, MASSACHUSETTS
BEACH EROSION CONTROL PROJECT
BORROW AREA
STA. 270+50 TO STA. 290+50

APPROVED: DIRECTOR OF ENGINEERING — DATE: JULY 1990

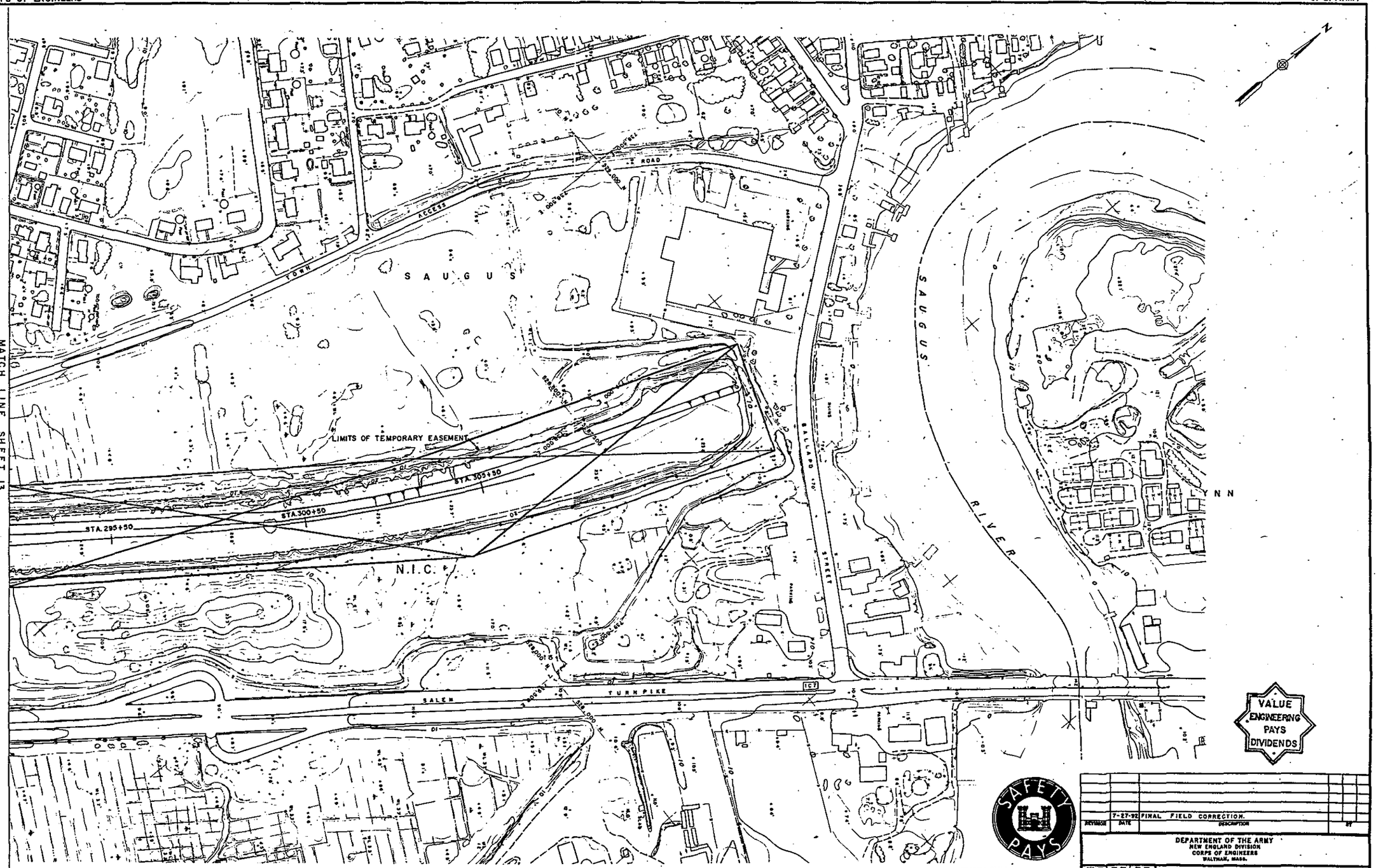
SCALE: 1"=100' | SPEC. NO. DACW 33-90-B-0094

DRAWING NUMBER
B.E. MASS.-63

SHEET 13 OF 16

CORPS OF ENGINEERS

U. S. ARMY



NOTE:
For Borrow Area General Notes see sheet 11 of 16.

GRAPHIC SCALE
1"=100' 100' 0 100' 200'

As Built Drawing
Contract No. DACW 33-90-C-0098

VALUE ENGINEERING PAYS DIVIDENDS

SAFETY PAYS

REVISION	DATE	DESCRIPTION	BY
	7-27-92	FINAL FIELD CORRECTION.	

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

DES. BY A.M.L. | DR. BY R.J.S. | CH. BY R.M.

SUBMITTED: PROJECT MANAGER

APPROVED: CHIEF, CONSTRUCTION BRANCH

APPROVED: CHIEF, ENGINEERING DIVISION

REVERE BEACH, MASSACHUSETTS
BEACH EROSION CONTROL PROJECT
BORROW AREA
STA. 290+50 TO STA. 305+50

APPROVED: DIRECTOR OF ENGINEERING
DATE JULY 1990

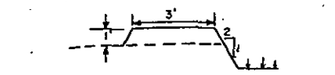
SCALE 1"=100'

SPEC. NO. DACW 33-90-B-0094

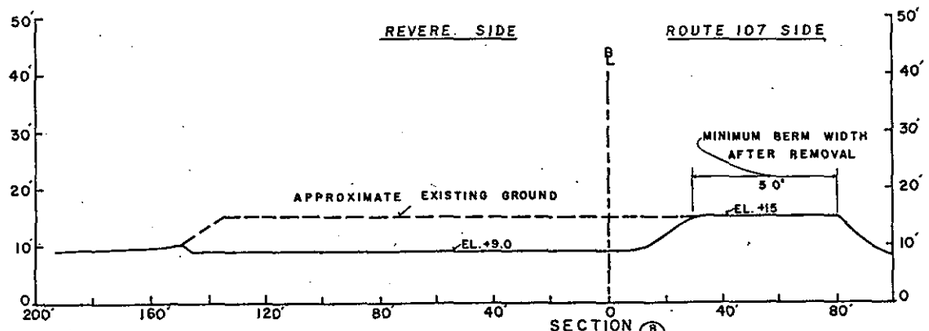
DRAWING NUMBER
B.E. MASS.-63

SHEET 14 OF 16

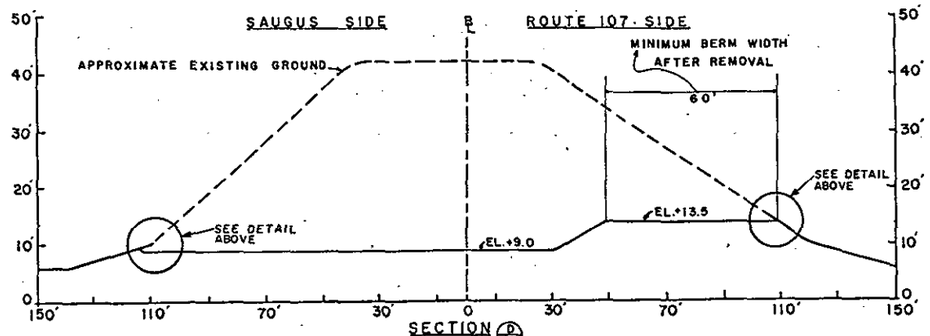
CORPS OF ENGINEERS — U. S. ARMY



TYPICAL EROSION REMEDIATION BERM
NOT TO SCALE
DETAIL A



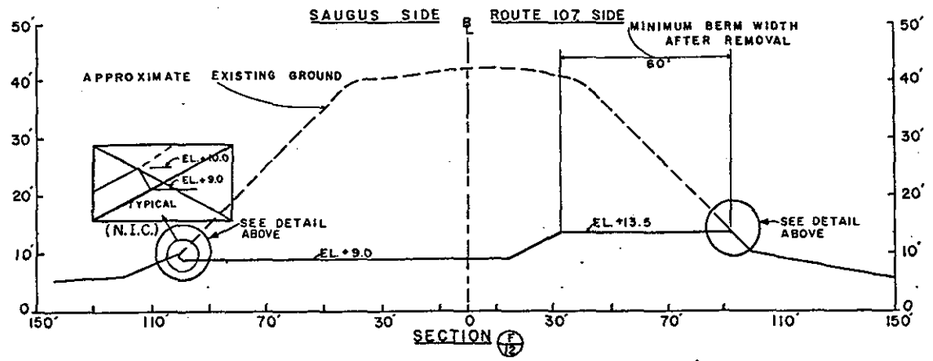
SECTION A/11



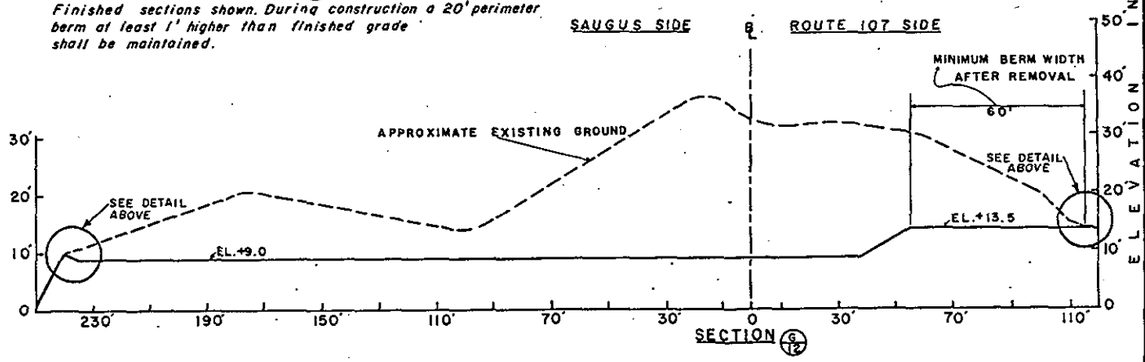
SECTION D/11

NOTE: Horizontal distances are in feet from the baseline (℄) (except section C/11).

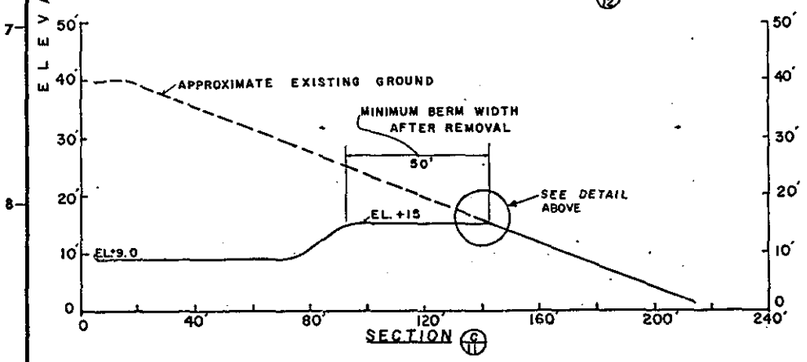
Finished sections shown. During construction a 20' perimeter berm at least 1' higher than finished grade shall be maintained.



SECTION F/12



SECTION G/12



SECTION G/11

ELEVATION IN FEET ABOVE N. G. V. D. 1929

VALUE ENGINEERING PAYS DIVIDENDS

SAFETY PAYS

GRAPHIC SCALES

1"=10' VERTICAL 10' 0 10' 20'

1"=20' HORIZONTAL 20' 0 20' 40'

As Built Drawing
Contract No. DACW 33-90-C-0098

REVISION	DATE	DESCRIPTION	BY
	7-27-92	FINAL FIELD CORRECTION.	
2	1-27-92	EROSION REMEDIATION PLAN.	
1	9-7-90	SECTION A DELETED. (AMEND. #1)	KM

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

DES. BY A.M.C. | DR. BY R.J.S. | CH. BY R.M.

SUBMITTED: PROJECT MANAGER

RECOMMENDED: CHIEF, COASTAL ENGINEERING BR.

APPROVED: CHIEF, DESIGN BRANCH

REVERE BEACH, MASSACHUSETTS
BEACH EROSION CONTROL PROJECT
BORROW AREA SECTIONS

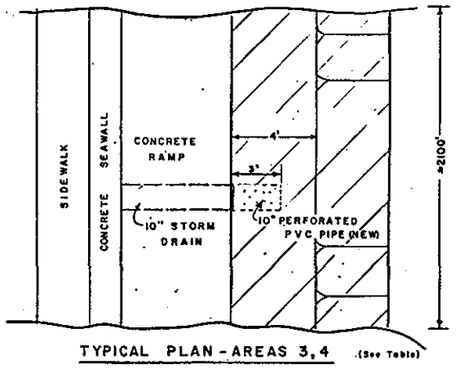
APPROVED: DIRECTOR OF ENGINEERING — DATE JULY 1990

SCALE As Shown | SPEC. NO. DACW 33-90-B-0094

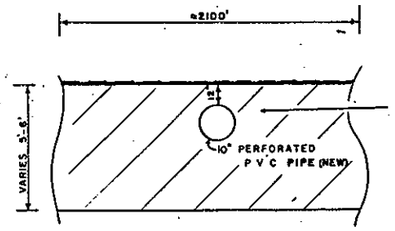
DRAWING NUMBER B.E. MASS.-63

SHEET 15 OF 16

CORPS OF ENGINEERS — U. S. ARMY

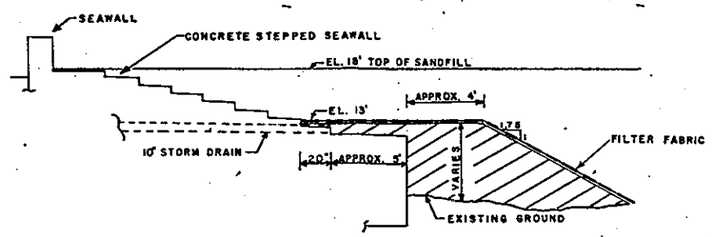


TYPICAL PLAN - AREAS 3, 4 (See Table)



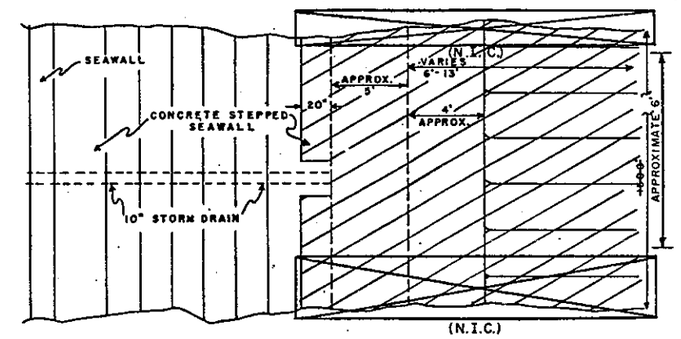
CONNECTION DETAILS FOR PVC PIPE TO EXISTING STORM DRAINS TO BE SUBMITTED FOR APPROVAL

TYPICAL SECTION - AREAS 3, 4 (See Table)

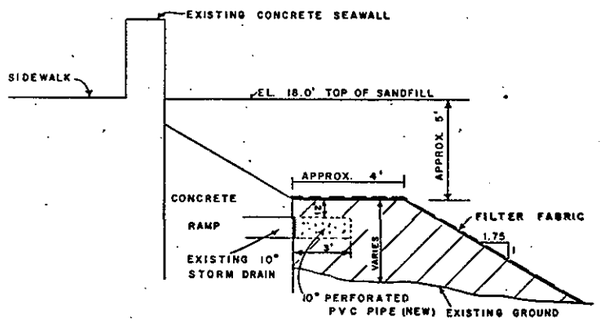


TYPICAL PROFILE AREA - 7 (See Table)

AREA	DRAIN OUTLET LOCATIONS	NO. DRAINS	REQUIRED SCREENED MATERIAL APPROX. VOL. (C.Y.)
1.	Elliot Circle - Vic. Sta. 0+00	1	50
2.	Area of Blocks - Vic. Sta. 37+70	2	100
3.	Ramped Seawall - Vic. Sta. 38+00 to 44+00	3	1,200
4.	Ramped Seawall - Vic. Sta. 44+00 to 59+00	4	3,000
5.	Seawall - Vic. Sta. 59+00 to 80+00	2	30
6.	No. Sanitary to Stepped Seawall - Vic. Sta. 93+00 to 117+00	3	45
7.	Stepped Seawall-Vic. Sta. 117+00 to 132+00	7	~~2,250~~ 350
8.	Area of Buttress Seawall - Vic. Sta. 132+00 to 140+00	2	80



TYPICAL PLAN AREA - 7 (See Table)



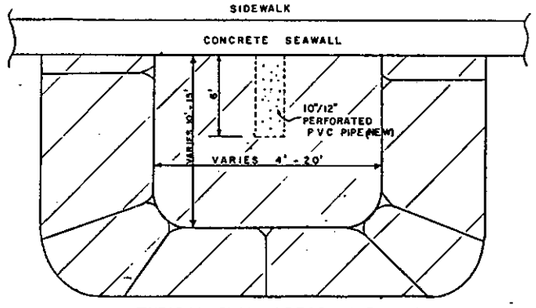
TYPICAL PROFILE - AREAS 3, 4 (See Table)

Screened Material Shown Thus:

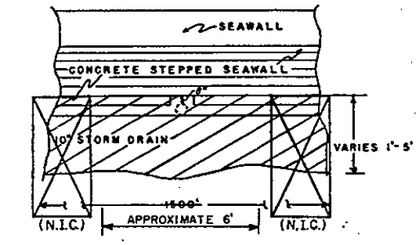
Slope of Fill Shown Thus:

Note: For General Notes See Sheet 1 of 16.

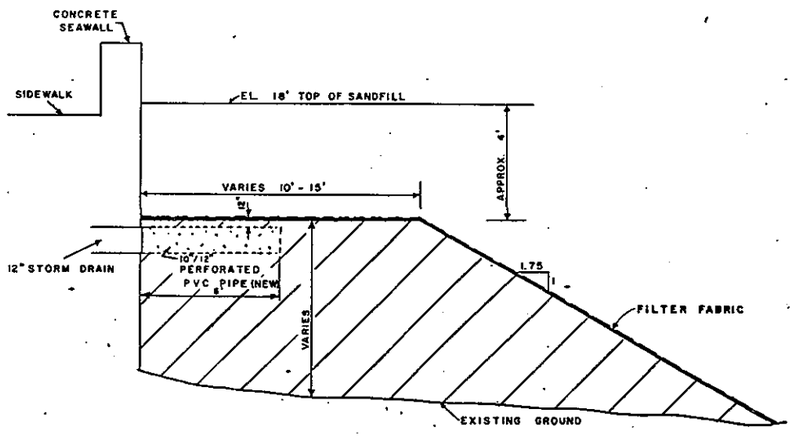
AREA 7 Contains occasional ramps at seaward edge of stepped seawall.
Filter Fabric shall be placed between the screened material (3/8") and the sand fill. Filter fabric properties and installation are described in Section 28 of the specifications. ⚠



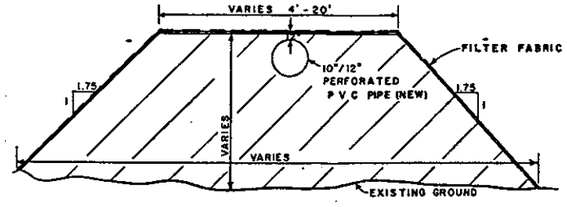
TYPICAL PLAN - AREAS 1, 2, 5, 6 & 8 (See Table)



TYPICAL SECTION AREA - 7 (See Table)



TYPICAL PROFILE - AREAS 1, 2, 5, 6 & 8 (See Table)



TYPICAL SECTION - AREAS 1, 2, 5, 6 & 8 (See Table)

VALUE ENGINEERING PAYS DIVIDENDS

SAFETY PAYS

NOT TO SCALE
N.T.S.

As Built Drawing
Contract No. DACW 33-90-C-0098

REVISION	DATE	DESCRIPTION	BY
⚠	8-21-90	REVISED WORDING FOR FILTER FABRIC PROPERTIES (AMD 3)	BH

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

DES. BY A.M.L. | DR. BY R.J.S. | CK. BY R.M.

SUBMITTED — PROJECT MANAGER

REVIEWED — CHIEF, COAST. ENGRG. BR.

APPROVED — CHIEF, DESIGN BRANCH

APPROVED — DIRECTOR OF ENGINEERING — DATE JULY 1990

REVERE BEACH, MASSACHUSETTS
BEACH EROSION CONTROL PROJECT
VICINITY OF STREET DRAINS
DETAILS

SCALE As Shown | SPEC. NO. DACW 33-90-B-0094

DRAWING NUMBER B.E. MASS.-63

SHEET 16 OF 16